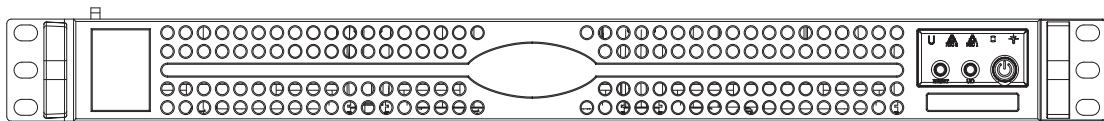


# SUPERO<sup>®</sup>

## SUPERSERVER 6015B-Ni



## USER'S MANUAL

1.0

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Manual Revision 1.0

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## Preface

### About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 6015B-Ni. Installation and maintenance should be performed by experienced technicians only.

The SuperServer 6015B-Ni is an economical, dual processor server based on the SC812L-520U 1U rackmount server chassis and the X7DBU, a dual processor serverboard that supports Intel® Xeon® 5300/5100/5000 series processors at a Front Side (System) Bus speed of 1333/1066/667 MHz and up to 32 GB of ECC FBD DDR2-667/533 SDRAM.

### Manual Organization

#### Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the SUPER X7DBU serverboard and the SC812L-520U chassis, which make up the SuperServer 6015B-Ni.

#### Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer 6015B-Ni into a rack and check out the server configuration prior to powering up the system. If your server was ordered without processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

#### Chapter 3: System Interface

Refer here for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

## **Chapter 4: System Safety**

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the SuperServer 6015B-Ni.

## **Chapter 5: Advanced Serverboard Setup**

Chapter 5 provides detailed information on the X7DBU serverboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the serverboard.

## **Chapter 6: Advanced Chassis Setup**

Refer to Chapter 6 for detailed information on the 1U SC812L-520U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring peripheral drives and when replacing the system power supply unit and cooling fans.

## **Chapter 7: BIOS**

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

## **Appendix A: BIOS POST Messages**

## **Appendix B: BIOS POST Codes**

## **Appendix C: Software Installation**

## **Appendix D: System Specifications**

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Appendix A: BIOS POST Messages

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# Chapter 1

## Introduction

### 1-1 Overview

Supermicro's SuperServer 6015B-Ni is an economic, dual processor 1U rackmount server. The SuperServer 6015B-Ni is comprised of two main subsystems: the SC812L-520U 1U rackmount chassis and the X7DBU dual processor serverboard. Please refer to our web site for information on operating systems that have been certified for use with the SuperServer 6015B-Ni. ([www.supermicro.com](http://www.supermicro.com))

In addition to the mainboard and chassis, various hardware components may have been included with your SuperServer 6015B-Ni, as listed below:

- Two (2) CPU heatsinks (SNK-P0017)
- Two (2) 10-cm blower fans (FAN-0059L)
- Three (3) riser cards (RSC-R1UU-2E8, RSC-R1UU-E8R and RSC-R1UU-XR)
- SATA Accessories:
  - One (1) 48-cm SATA cable (CBL-0206L)
  - One (1) 59-cm SATA cable (CBL-0207L)
  - One (1) 70-cm SATA cable (CBL-0208L)
- Rackmount hardware with screws (CSE-PT34)
  - Two (2) rack rail assemblies
  - Six (6) brackets for mounting the rack rails to a rack/telco rack
- One (1) CD-ROM containing drivers and utilities:
- SuperServer 6015B-Ni User's Manual

## 1-2 Serverboard Features

At the heart of the SuperServer 6015B-Ni lies the X7DBU, a dual processor serverboard based on Intel's 5000P chipset. Below are the main features of the X7DBU (see Figure 1-1 for a block diagram of the chipset).

### Processors

The X7DBU supports single or dual 771-pin Intel Xeon 5300/5100/5000 series processors at a FSB speed of 1333/1066/667 MHz. Please refer to the serverboard description pages on our web site for a complete listing of supported processors.

### Memory

The X7DBU has eight 240-pin DIMM sockets that can support up to 32 GB of ECC FBD (Fully Buffered DIMM) DDR2-667 or DDR2-533 SDRAM. The memory is an interleaved configuration, which requires modules of the same size and speed to be installed in pairs. Please refer to Chapter 5 for memory speed jumper settings.

### UIO

The X7DBU is a specially-designed serverboard that features Supermicro's UIO (Universal I/O) technology. UIO serverboards have a PCI-Express x8 connector that can support any one of several types of UIO card types to add SAS ports, additional LAN ports, etc. to the serverboard. This allows the user to tailor the serverboard to their own needs.

### Serial ATA

An on-chip (ESB2) SATA controller is integrated into the X7DBU to provide a six-port, 3 Gb/sec Serial ATA subsystem, which is RAID 0, 1 and 10 supported. The SATA drives are hot-swappable units. **Note:** The operating system you use must have RAID support to enable the hot-swap capability and RAID function of the Serial ATA drives.

### Onboard Controllers/Ports

One floppy drive controller and one onboard ATA/100 controller are provided to support up to two IDE hard drives or ATAPI devices. The color-coded I/O ports include one COM port, a VGA (monitor) port, two USB 2.0 ports, PS/2 mouse and keyboard ports and two gigabit Ethernet ports.

## ATI Graphics Controller

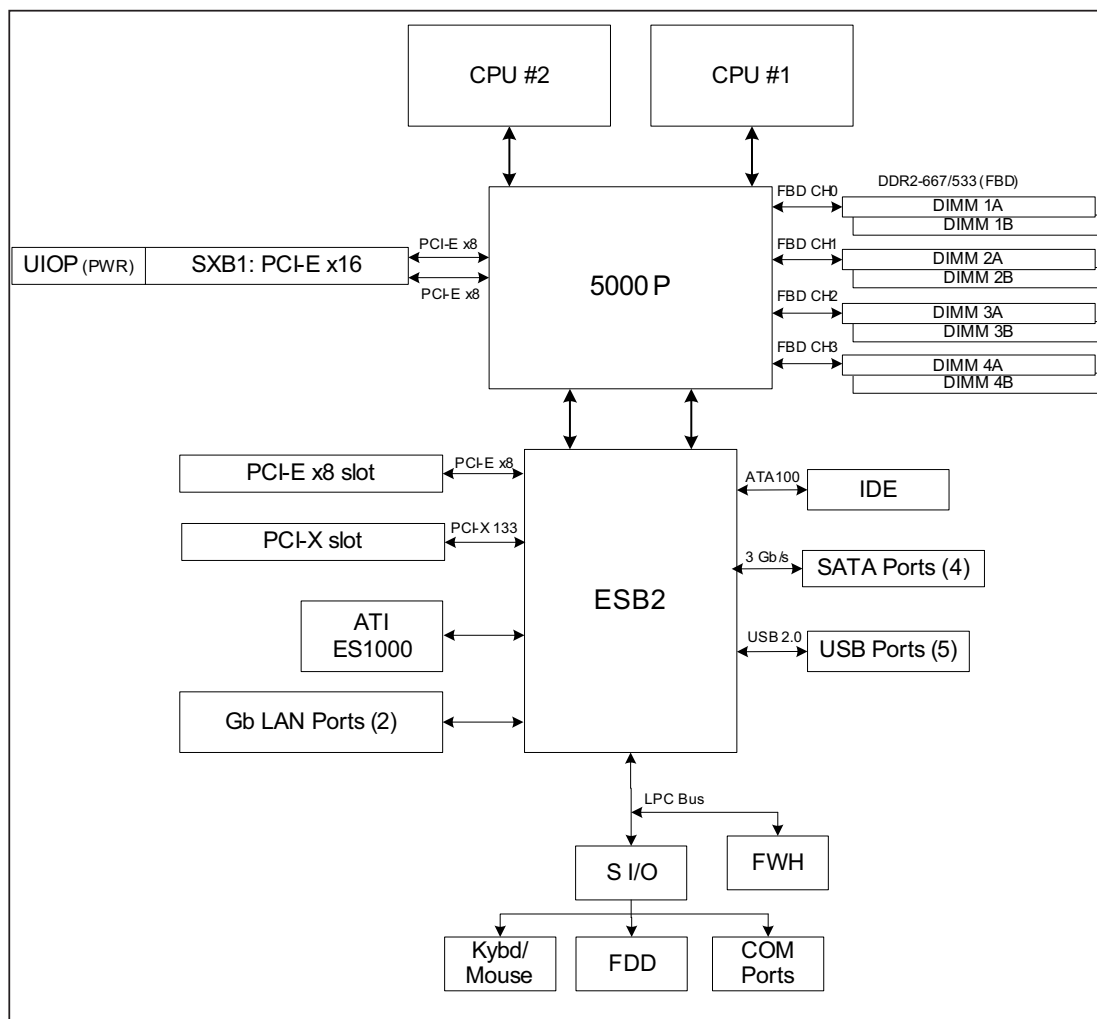
The X7DBU features an integrated ATI video controller based on the ES1000 graphics chip. The ES1000 was designed specifically for servers, featuring low power consumption, high reliability and superior longevity.

## Other Features

Other onboard features that promote system health include onboard voltage monitors, a chassis intrusion header, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection and BIOS rescue.

**Figure 1-1. Intel 3010 Chipset:  
System Block Diagram**

Note: This is a general block diagram. Please see Chapter 5 for details.



## 1-3 Server Chassis Features

The SC812L-520U is Supermicro's second-generation 1U chassis and features three hard drive bays, two front side USB ports and a revolutionary cooling design that can keep today's most powerful processors running well below their temperature thresholds. The following is a general outline of the main features of the SC812L-520U chassis.

### System Power

When configured as a SuperServer 6015B-Ni, the SC812L-520U chassis includes a 520W power supply.

### Control Panel

The SC812L-520U control panel provides important system monitoring and control information. LEDs indicate power on, network activity, hard disk drive activity, UID and system overheat conditions. Also present are a main power button, a system reset button and a UID button.

### I/O Backplane

The SC812L-520U is a 1U rackmount chassis. Its I/O backplane provides three standard size PCI slots, one COM port (the other is internal), one VGA port, two USB ports, PS/2 mouse and keyboard ports, two Ethernet (LAN) ports and a UID LED.

### Cooling System

The SC812L-520U chassis' revolutionary cooling design has been optimized to provide sufficient cooling for dual CPU configurations. The SC812L-520U includes two heavy duty 10-cm blower fans located in the middle of the chassis. These fans operate continuously at full rpm. An overheat LED will be activated if they break down and the ambient air temperature inside the chassis rises.

## 1-4 Contacting Super Micro

### Headquarters

Address: Super Micro Computer, Inc.  
980 Rock Ave.  
San Jose, CA 95131 U.S.A.  
Tel: +1 (408) 503-8000  
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[support@supermicro.com](mailto:support@supermicro.com) (Technical Support)  
Web Site: [www.supermicro.com](http://www.supermicro.com)

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Taiwan, R.O.C.  
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Web Site: [www.supermicro.com.tw](http://www.supermicro.com.tw)  
Technical Support:  
Email: [support@supermicro.com.tw](mailto:support@supermicro.com.tw)  
Tel: 886-2-8228-1366, ext.132 or 139

**Notes**



## Chapter 2

# Server Installation

### 2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 6015B-Ni up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time. This quick setup assumes that your SuperServer 6015B-Ni system has come to you with the processors and memory preinstalled. If your system is not already fully integrated with a serverboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

### 2-2 Unpacking the System

You should inspect the box the SuperServer 6015B-Ni was shipped in and note if it was damaged in any way. If the server itself shows damage you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the SuperServer 6015B-Ni. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

### 2-3 Preparing for Setup

The box the SuperServer 6015B-Ni was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

## Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches).
- Leave approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.
- This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).
- This product is not suitable for use with visual display work place devices according to §2 of the the German Ordinance for Work with Visual Display Units.



## Warnings and Precautions!



### Rack Precautions:

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack.
- In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

### Server Precautions:

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the power supply units to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

## **Rack Mounting Considerations**

### **Ambient Operating Temperature**

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

### **Reduced Airflow**

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

### **Mechanical Loading**

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

### **Circuit Overloading**

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

### **Reliable Ground**

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

## 2-4 Installing the System into a Rack

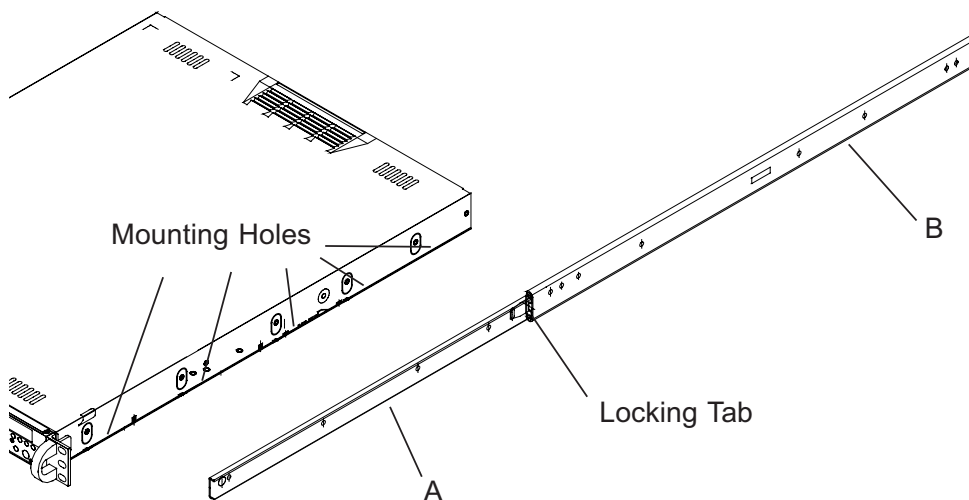
This section provides information on installing the SuperServer 6015B-Ni into a rack. If the 6015B-Ni has already been mounted into a rack, you can skip ahead to Sections 2-5 and 2-6. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. The following is a guideline for installing the 6015B-Ni into a rack with the rack rails provided. You should also refer to the installation instructions that came with the rack unit you are using.

### Identifying the Sections of the Rack Rails

You should have received two rack rail assemblies with the SuperServer 6015B-Ni. Each of these assemblies consist of three sections: an inner fixed chassis rail that secures to the 6015B-Ni (A) and an outer fixed rack rail that secures directly to the rack itself (B). A sliding rail guide sandwiched between the two should remain attached to the fixed rack rail. (See Figure 2-1.) The A and B rails must be detached from each other to install.

To remove the fixed chassis rail (A), pull it out as far as possible - you should hear a "click" sound as a locking tab emerges from inside the rail assembly and locks the inner rail. Then depress the locking tab to pull the inner rail completely out. Do this for both the left and right side rack rail assemblies.

**Figure 2-1. Identifying the Sections of the Rack Rails**

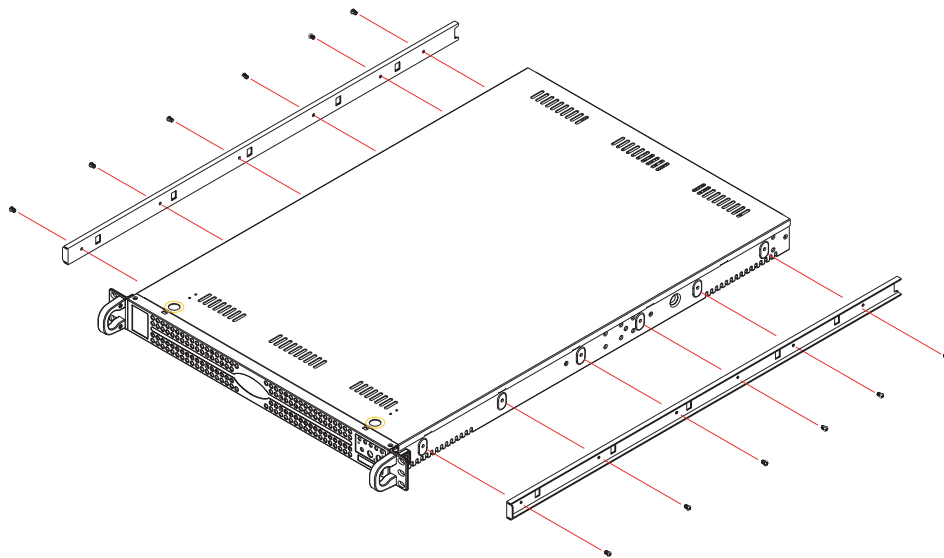


## Installing the Chassis Rails

Position the fixed chassis rail sections you just removed along the side of the 6015B-Ni making sure the screw holes line up. Note that these two rails are left/right specific. Screw the rail securely to the side of the chassis (see Figure 2-2). Repeat this procedure for the other rail on the other side of the chassis. You will also need to attach the rail brackets when installing into a telco rack.

**Locking Tabs:** As you have seen, both chassis rails have a locking tab, which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal position. Secondly, these tabs also lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing.

**Figure 2-2. Installing Chassis Rails**



## Installing the Rack Rails

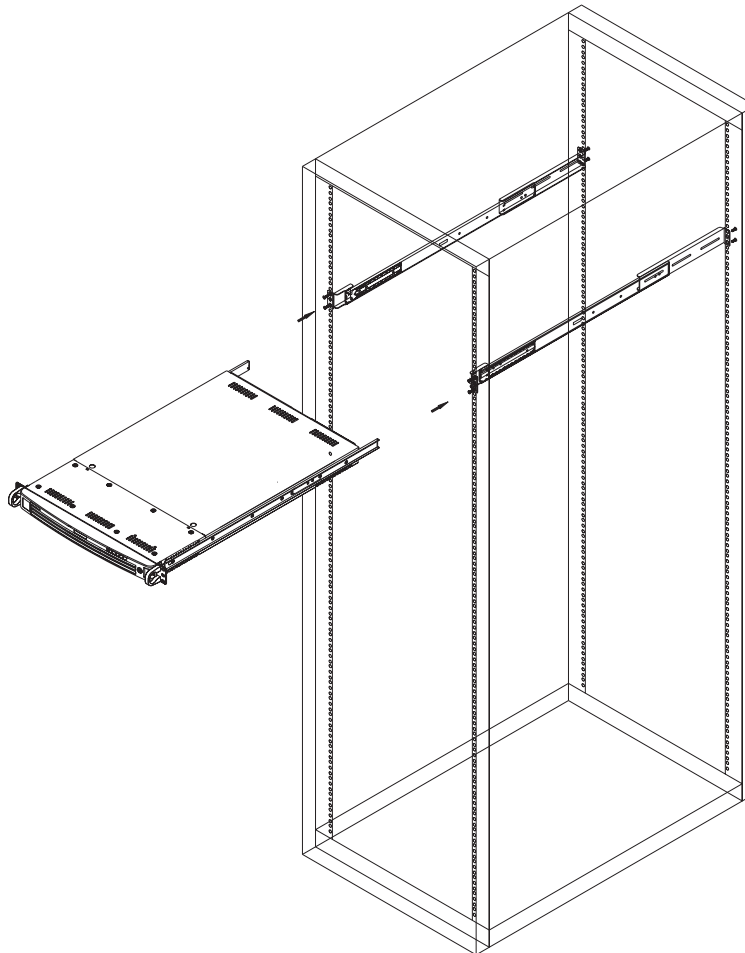
Determine where you want to place the SuperServer 6015B-Ni in the rack. (See [Rack and Server Precautions in Section 2-3.](#)) Position the fixed rack rail/sliding rail guide assemblies at the desired location in the rack, keeping the sliding rail guide facing the inside of the rack. Screw the assembly securely to the rack using the brackets provided. Attach the other assembly to the other side of the rack, making sure both are at the exact same height and with the rail guides facing inward.

## Installing the Server into the Rack

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the rack. Do this by lining up the rear of the chassis rails with the front of the rack rails. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). See Figure 2-3.

When the server has been pushed completely into the rack, you should hear the locking tabs "click". Finish by inserting and tightening the thumbscrews that hold the front of the server to the rack.

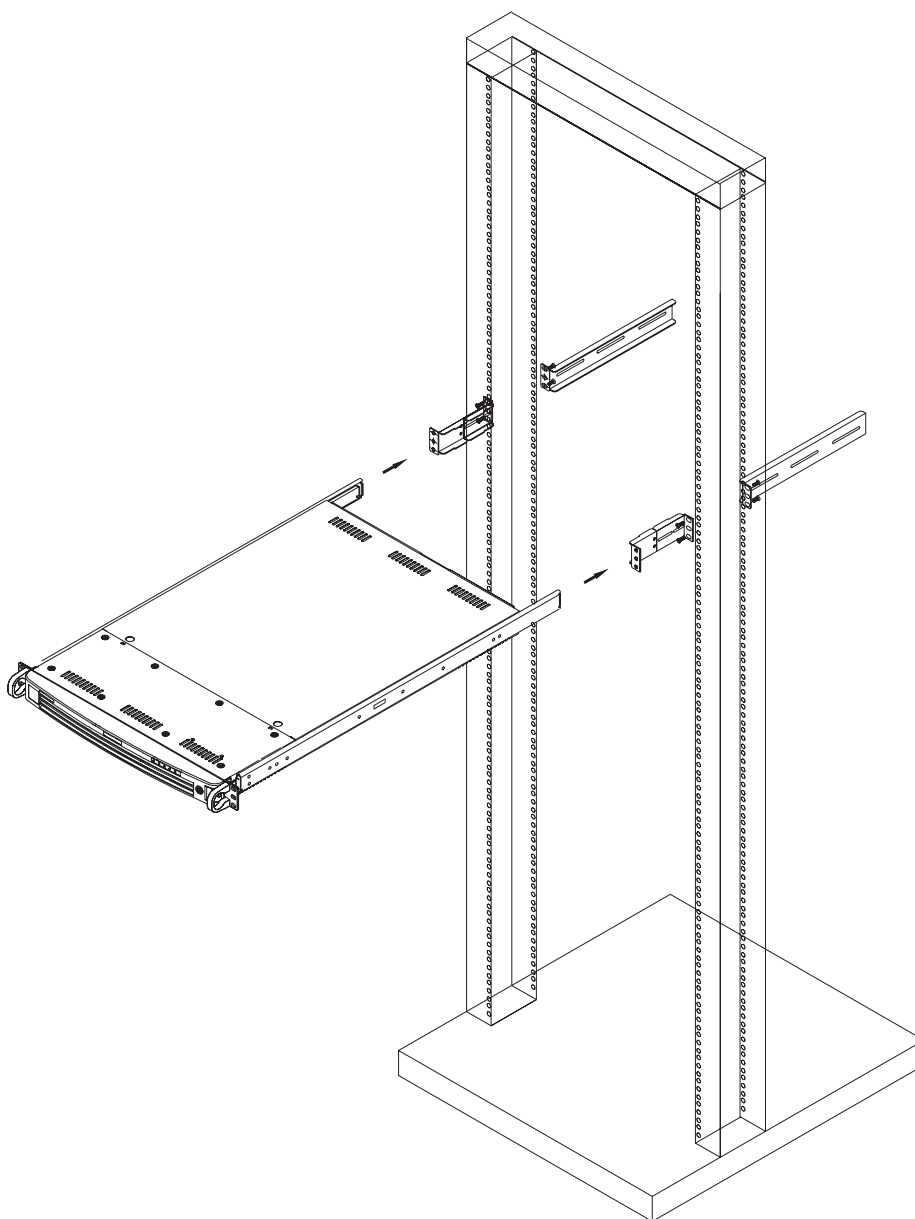
**Figure 2-3. Installing the Server into a Rack**



## Installing the Server into a Telco Rack

To install the SuperServer 6015B-Ni into a Telco type rack, use two L-shaped brackets on either side of the chassis (four total). First, determine how far the server will extend out the front of the rack. Larger chassis should be positioned to balance the weight between front and back. If a bezel is included on your server, remove it. Then attach the two front brackets to each side of the chassis, then the two rear brackets positioned with just enough space to accommodate the width of the telco rack. Finish by sliding the chassis into the rack and tightening the brackets to the rack.

**Figure 2-4. Installing the Server into a Telco Rack**



## 2-5 Checking the Serverboard Setup

After you install the 6015B-Ni in the rack, you will need to open the unit to make sure the serverboard is properly installed and all the connections have been made.

### 1. Accessing the inside of the 6015B-Ni (see Figure 2-5)

First, release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover. There is a large rectangular recess in the middle front of the top cover to help you push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server.

### 2. Check the CPUs (processors)

You should have one or two processors already installed into the system board. Each processor needs its own heatsink. See Chapter 5 for instructions on processor and heatsink installation.

### 3. Check the system memory

Your 6015B-Ni server system may have come with system memory already installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Chapter 5.

### 4. Installing add-on cards

If desired, you can install add-on cards to the system. See Chapter 5 for details on installing PCI add-on cards.

### 5. Check all cable connections and airflow

Make sure all power and data cables are properly connected and not blocking the chassis airflow. See Chapter 5 for details on cable connections. Also, check the air seals for damage. The air seals are located under the blower fan and beneath the frame cross section that separates the drive bay area from the serverboard area of the chassis.



## 2-6 Checking the Drive Bay Setup

Next, you should check to make sure the hard drives have been properly installed and all connections have been made.

### 1. Accessing the drive bays

For servicing the hard drives, you will need to remove the top chassis cover. If you need to remove or install hard drives, please refer to Chapter 6.

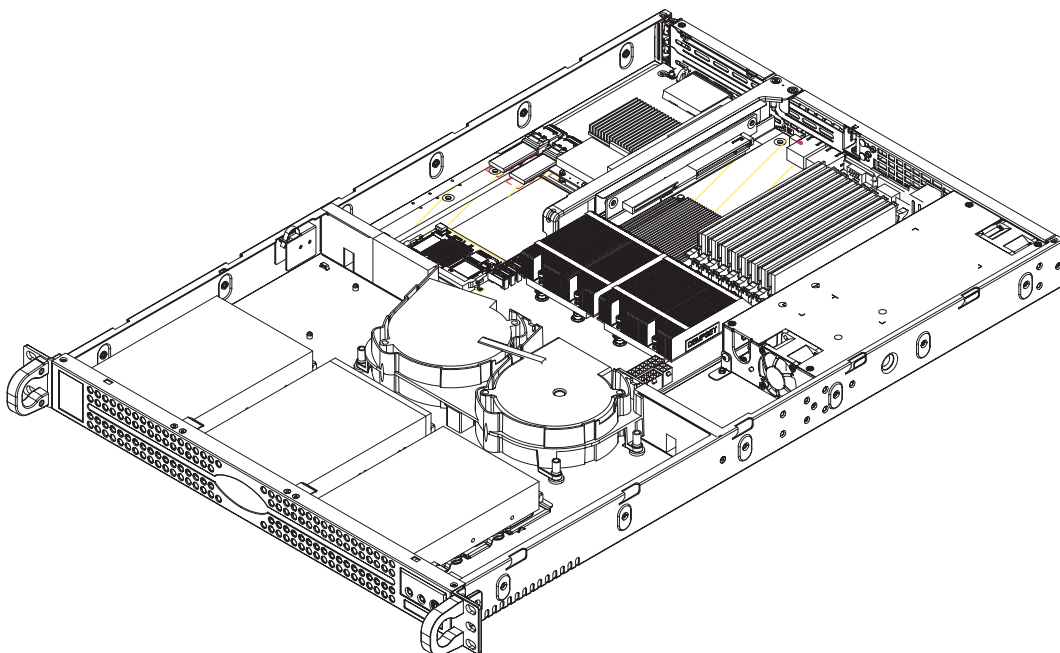
### 2. Check the airflow

Airflow is provided by two heavy-duty 10-cm blower fans. The system component layout was carefully designed to direct sufficient cooling airflow to the components that generate the most heat. Note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

### 3. Supplying power to the system

The last thing you must do is to provide input power to the system. Plug the power cord from the power supply unit into a high-quality power strip that offers protection from electrical noise and power surges. It is recommended that you use an uninterruptible power supply (UPS). Turn on the power switch on the back of the power supply, then depress the power button on the front chassis control panel.

**Figure 2-5. Accessing the Inside of the SuperServer 6015B-Ni**



**Notes**

## Chapter 3

# System Interface

### 3-1 Overview

There are several LEDs on the control panel to keep you constantly informed of the overall status of the system. There are also three buttons on the chassis control panel.

### 3-2 Control Panel Buttons

There are three buttons located on the front of the chassis: a reset button, a power on/off button and a UID button.

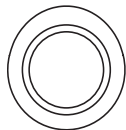
RESET



- **RESET:** Use the reset button to reboot the system.



- **POWER:** This is the main power button, which is used to apply or turn off the main system power. Turning off system power with this button removes the main power but keeps standby power supplied to the system.



- **UID:** Depressing the UID (unit identifier) button illuminates an LED on both the front and rear of the chassis for easy system location in large stack configurations. The LED will remain on until the button is pushed a second time. Another UID button on the rear of the chassis serves the same function. See the table in Figure 3-1 for descriptions of UID LED states.

### 3-3 Control Panel LEDs

The control panel located on the front of the SC812L-520U chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.



- **Universal Information LED:** When this LED blinks red slowly, it indicates a fan failure and when blinking red quickly a power failure. This LED will be blue when used for UID (Unit Identifier). When on continuously it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly (see Chapter 5). This LED will remain flashing or on as long as the indicated condition exists. See the table below for descriptions of the LED states.

**Figure 3-1. Universal Information LED States**

Universal Information LED States	
State	Indication
Slow Blinking Red (1x/sec)	Fan Fail
Solid Red	CPU Overheat
Fast Blinking Red (4x/sec)	Power Fail
Solid Blue	Local UID Button Depressed
Blinking Blue	IPMI-Activated UID

**Note:** deactivating the UID LED must be performed in the same way it was activated. (If the UID LED was activated via IPMI, you can only turn the LED off via IPMI and not with the UID button.)



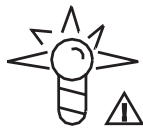
- **NIC2:** Indicates network activity on LAN2 when flashing.



- **NIC1:** Indicates network activity on LAN1 when flashing.



- **HDD:** Indicates IDE channel activity when flashing.



- **Power:** Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

**Notes**

## Chapter 4

### System Safety

#### 4-1 Electrical Safety Precautions



Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 6015B-Ni from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.
- Do not work alone when working with high voltage components.
- Power should always be disconnected from the system when removing or installing main system components, such as the serverboard, memory modules and the DVD-ROM and floppy drives (not necessary for SATA drives). When disconnecting power, you should first power down the system with the operating system and then unplug the power cords from all the power supply modules in the system.
- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.
- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.
- Do not use mats designed to decrease electrostatic discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.
- The power supply power cord must include a grounding plug and must be plugged into grounded electrical outlets.

- Serverboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarities (see Figure 4-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
- DVD-ROM Laser: **CAUTION** - this server may have come equipped with a DVD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.
- Mainboard replaceable soldered-in fuses: Self-resetting PTC (Positive Temperature Coefficient) fuses on the mainboard must be replaced by trained service technicians only. The new fuse must be the same or equivalent as the one replaced. Contact technical support for details and support.

## 4-2 General Safety Precautions



Follow these rules to ensure general safety:

- Keep the area around the SuperServer 6015B-Ni clean and free of clutter.
- The SuperServer 6015B-Ni weighs approximately 33 lbs. (15 kg.) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.
- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.
- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.
- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.



- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

### 4-3 ESD Precautions



Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

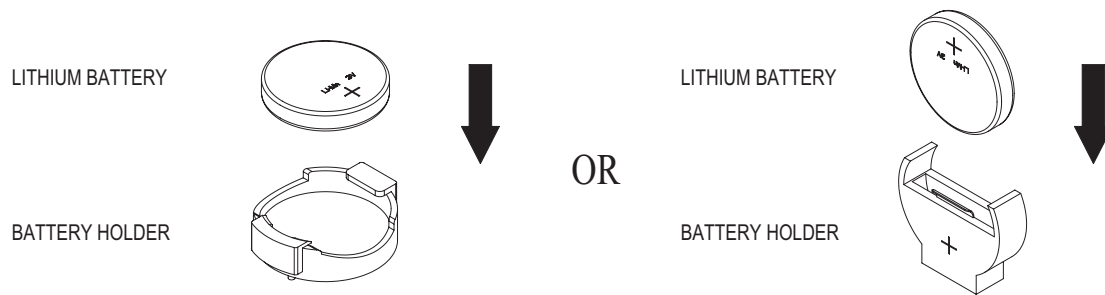
- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

## 4-4 Operating Precautions



Care must be taken to assure that the chassis cover is in place when the 6015B-Ni is operating to ensure proper cooling. Out of warranty damage to the 6015B-Ni system can occur if this practice is not strictly followed.

**Figure 4-1. Installing the Onboard Battery**



## Chapter 5

# Advanced Serverboard Setup

This chapter covers the steps required to install processors and heatsinks to the X7DBU serverboard, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are described and a layout and quick reference chart are included in this chapter. Remember to close the chassis completely when you have finished working on the serverboard to protect and cool the system sufficiently.

### 5-1 Handling the Serverboard

Static electrical discharge can damage electronic components. To prevent damage to printed circuit boards, it is important to handle them very carefully (see Chapter 4). Also note that the size and weight of the serverboard can cause it to bend if handled improperly, which may result in damage. To prevent the serverboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from static discharge.

#### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.

#### Unpacking

The serverboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

## 5-2 Processor and Heatsink Installation



When handling the processor, avoid placing direct pressure on the label area of the fan. Also, do not place the serverboard on a conductive surface, which can damage the BIOS battery and prevent the system from booting up.

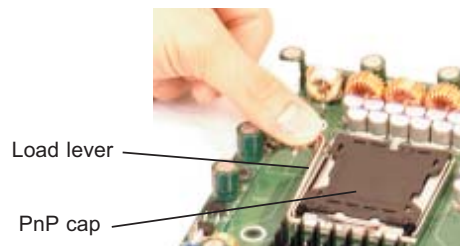
**IMPORTANT!** Always connect the power cord last and remove it first before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket *before* you install the heatsink and fan. The X7DBU can support either one or two Xeon 5300/5100/5000 type processors. If installing one processor only, install it into CPU socket #1.

### Notes:

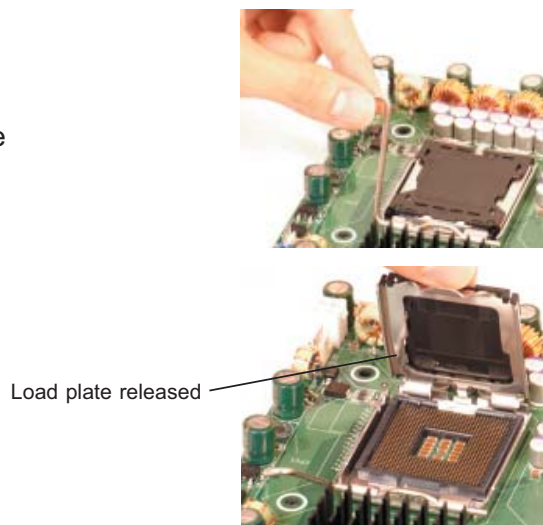
1. Intel's boxed Xeon CPU package contains a CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel-certified multi-directional heatsinks and fans.
2. When purchasing a Xeon 5300/5100/5000 CPU or when receiving a serverboard with a CPU pre-installed, make sure that the CPU plastic cap is in place and none of the CPU pins are bent; otherwise, contact the retailer immediately.

### Installing the Processor

1. A black PnP cap is attached to the load plate to protect the CPU socket. Press the load lever down and away from the retention clasp to release the load plate from its locked position.



2. Gently lift the load lever to open the load plate.



3. Use your thumb and your index finger to hold the CPU at opposite sides.

4. Align pin1 of the CPU (the corner marked with a triangle) with the notched corner of the CPU socket.

5. Find the corner of the CPU that has a semi-circle cutout below a gold dot (CPU key). This corner should be aligned with the cutout on the socket (socket key).

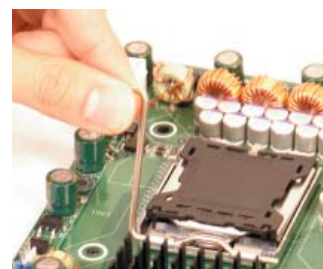
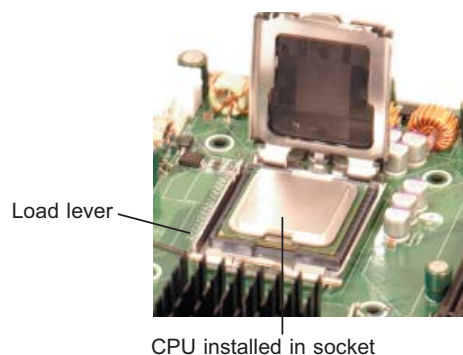
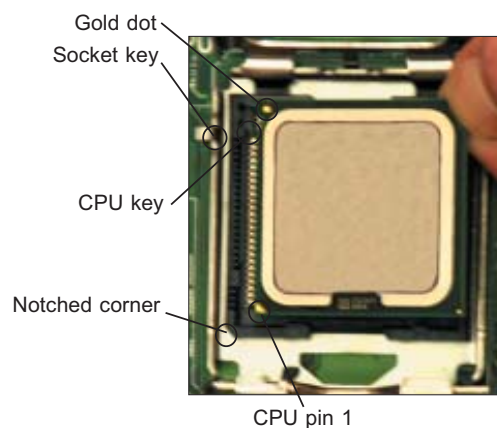
6. Once aligned, carefully lower the CPU straight down into the socket. Do not drop the CPU on the socket, do not move the CPU horizontally or vertically and do not rub the CPU against any surface or any of the contacts, which may damage the CPU and/or contacts.

7. With the CPU in the socket, inspect the four corners of the CPU to make sure that it is properly installed.

8. Use your thumb to gently push the load lever down until it snaps into the retention clasp.

9. If the CPU is properly installed into the socket, the PnP cap will be automatically released from the load plate when the lever locks. Repeat steps to install a second CPU if desired.

**Warning!** Keep the plastic PnP cap. The serverboard must be shipped with the PnP cap properly installed to protect the CPU socket. Shipment without the PnP cap properly installed will void the warranty.



PnP cap released  
from load plate



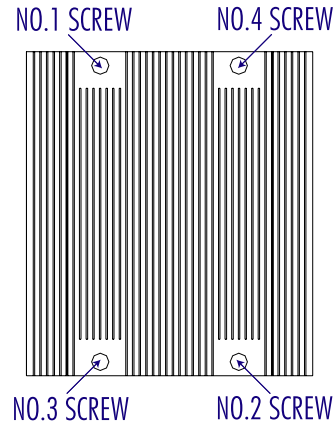
## Installing the Heatsink

1. Do not apply any thermal grease to the heatsink or the CPU die; the required amount has already been applied.

2. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the (preinstalled) heatsink retention mechanism.

3. Screw in two diagonal screws (i.e. the #1 and the #2 screws) until just snug. Do not fully tighten the screws or you may damage the CPU.)

4. Add the two remaining screws then finish the installation by fully tightening all four screws.



## Removing the Heatsink



**Warning!** We do not recommend that the CPU or the heatsink be removed. However, if you do need to uninstall the heatsink, please follow the instructions below to prevent damage to the CPU or the CPU socket.

1. Unscrew and remove the heatsink screws from the serverboard in the sequence as show in the picture above.

2. Hold the heatsink and gently wriggle the heatsink to loosen it from the CPU. (Do not use excessive force when wriggling the heatsink!!)

3. Once the heatsink is loose, remove it from the CPU.

4. Clean the surface of the CPU and the heatsink to get rid of the old thermal grease. Reapply the proper amount of thermal grease on the surface before you re-install the heatsink.

## 5-3 Connecting Cables

Now that the processors are installed, the next step is to connect the cables to the serverboard. These include the data (ribbon) cables for the peripherals and control panel and the power cables.

### Connecting Data Cables

The ribbon cables used to transfer data from the peripheral devices have been carefully routed in preconfigured systems to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to reroute them as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). If you are configuring the system, keep the airflow in mind when routing the cables. The following data cables (with their serverboard connector locations noted) should be connected. See the serverboard layout diagram in this chapter for connector locations.

- DVD-ROM Drive cable (IDE#1)
- Control Panel cable (JF1, see next page)
- SATA cables (SATA0 ~ SATA3)

### Connecting Power Cables

The X7DBU has a 20-pin primary power supply connector designated "JPW1" for connection to the ATX power supply. Connect the appropriate connector from the power supply to JPW1 to supply power to the serverboard. See the Connector Definitions section in this chapter for power connector pin definitions.

In addition, your power supply must be connected to the 4-pin Auxiliary ATX Power connection at JPW2 and the 8-pin Processor Power connector at JPW3.

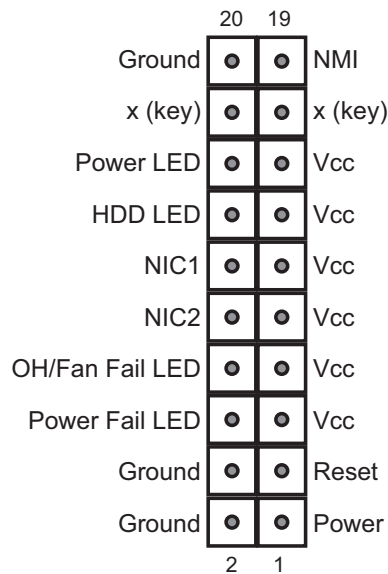
## Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-1 for the pin locations of the various front control panel buttons and LED indicators. Please note that even and odd numbered pins are on opposite sides of each header.

All JF1 wires have been bundled into single keyed ribbon cable to simplify their connection. The red wire in the ribbon cable plugs into pin 1 of JF1. Connect the other end of the cable to the Control Panel printed circuit board, located just behind the system status LEDs in the chassis.

See the Connector Definitions section in this chapter for details and pin descriptions of JF1.

**Figure 5-1. Front Control Panel Header Pins (JF1)**

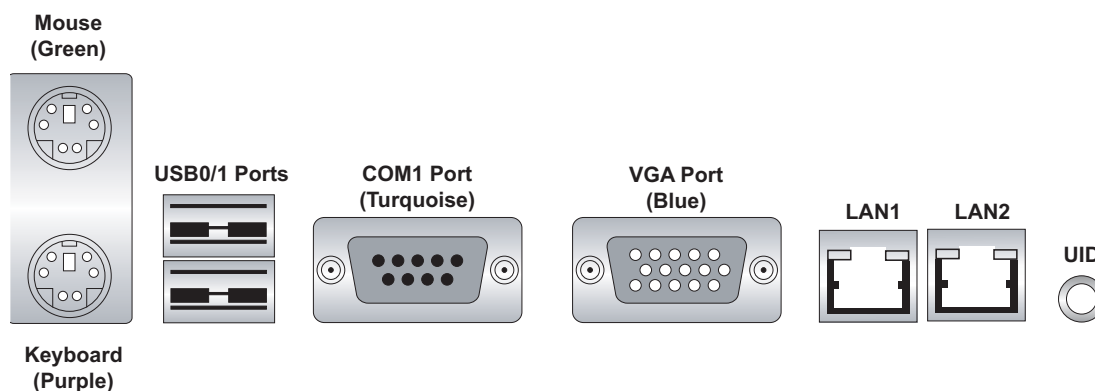




## 5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-2 below for the colors and locations of the various I/O ports.

**Figure 5-2. Rear Panel I/O Ports**



## 5-5 Installing Memory

**Note:** Check the Supermicro web site for recommended memory modules.

### **CAUTION**

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage. Also note that the memory is interleaved to improve performance (see step 1).

### **DIMM Installation (See Figure 5-5)**

1. Insert the desired number of DIMMs into the memory slots, starting with slot DIMM#1A and DIMM#1B. The memory scheme is interleaved so you must install two modules at a time.
2. Insert each DIMM module vertically into its slot. Pay attention to the notch along the bottom of the module to prevent inserting the DIMM module incorrectly.
3. Gently press down on the DIMM module until it snaps into place in the slot. Repeat for all modules (see step 1 above).

### **Memory Support**

The X7DBU supports up to 32 GB of ECC FBD (Fully Buffered DIMM) DDR2-667 or DDR2-533 SDRAM. The memory is an interleaved configuration, which requires

modules of the same size and speed to be installed in pairs. You should not mix DIMMs of different sizes and speeds.

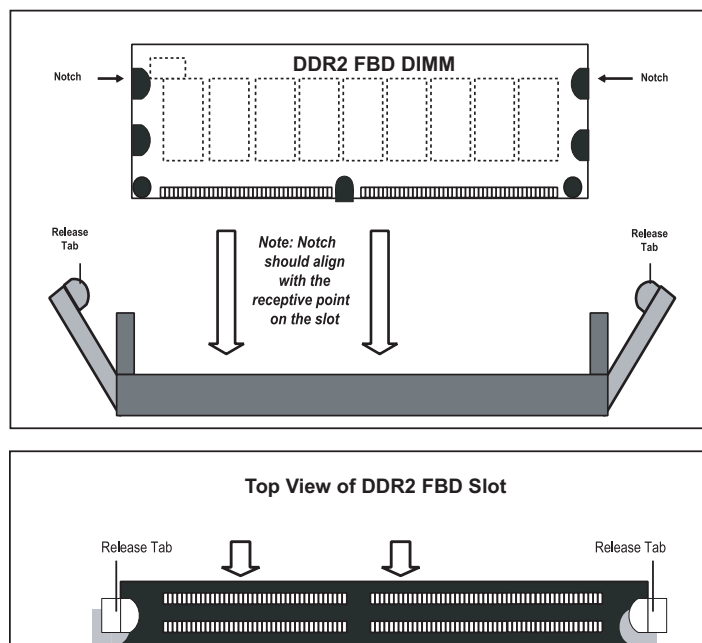
**Notes:** Due to OS limitations, some operating systems may not show more than 4 GB of memory. Due to memory allocation to system devices, memory remaining available for operational use will be reduced when 4 GB of RAM is used. The reduction in memory availability is disproportional. (Refer to the Memory Availability Table below for details.)

Possible System Memory Allocation & Availability		
System Device	Size	Physical Memory Remaining (4 GB Total System Memory)
Firmware Hub flash memory (System BIOS)	1 MB	3.99
Local APIC	4 KB	3.99
Area Reserved for the chipset	2 MB	3.99
I/O APIC (4 Kbytes)	4 KB	3.99
PCI Enumeration Area 1	256 MB	3.76
PCI Express (256 MB)	256 MB	3.51
PCI Enumeration Area 2 (if needed) -Aligned on 256-MB boundary-	512 MB	3.01
VGA Memory	16 MB	2.85
TSEG	1 MB	2.84
Memory available to System BIOS & OS applications		2.84

**Figure 5-3. Installing DIMM into Slot**

**To Install:** Insert module vertically and press down until it snaps into place. Pay attention to the bottom notch.

**To Remove:** Use your thumbs to gently push each release tab outward to free the DIMM from the slot.



## 5-6 Adding PCI Cards

### 1. PCI Expansion Slots

Two riser cards are used to support add-on cards to the system. The SC812L-520U chassis can accommodate two standard size (full height full length) and one low profile PCI expansion card. When viewed from the chassis front, the standard size card installs to the left and the low-profile card installs to the right side.

PCI cards are installed into riser cards that have been pre-installed to the system. An additional two riser cards are included to support PCI-E add-on cards. See configuration list below.

### 2. PCI card installation

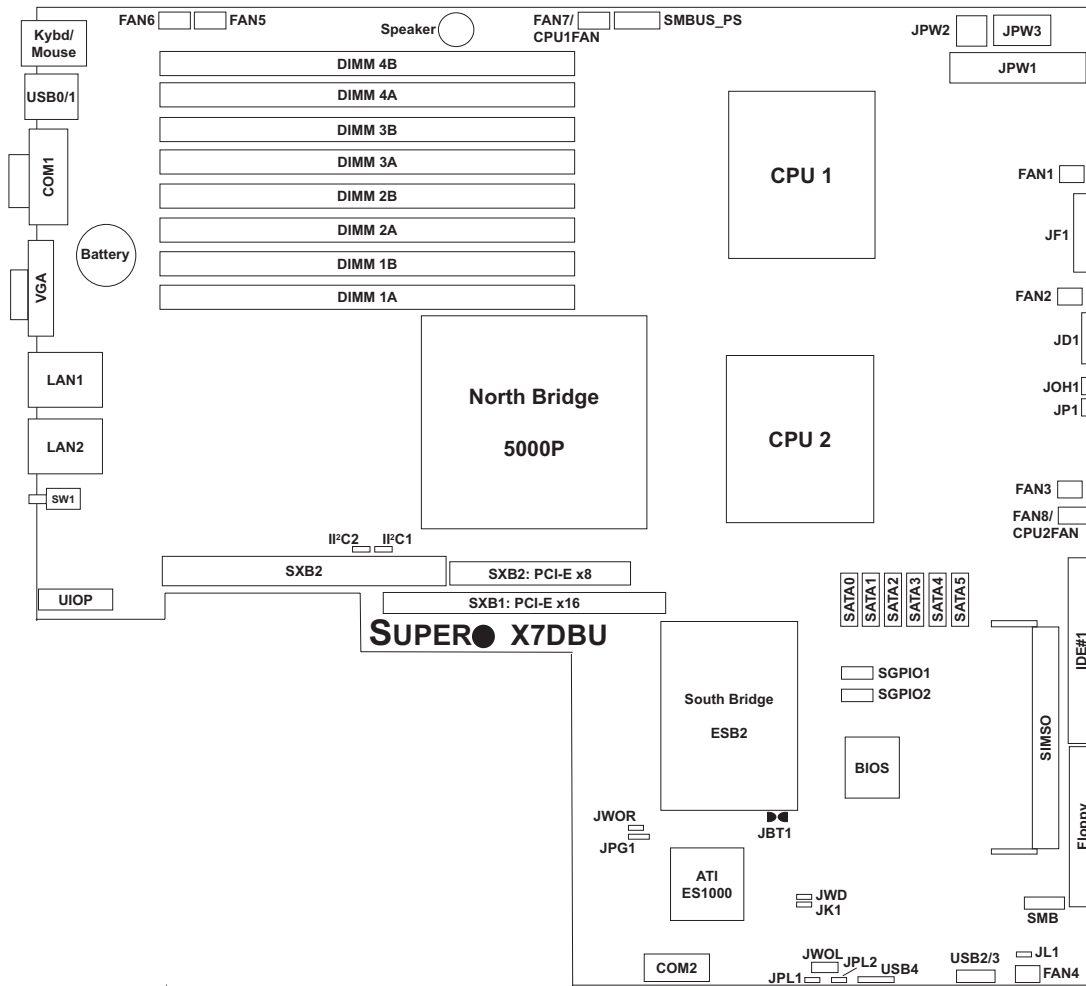
Before installing a PCI add-on card, make sure you install it into the correct riser card. Begin by releasing the locking tab that corresponds to the slot you wish to populate. Insert the expansion card into the correct riser card, pushing down with your thumbs evenly on both sides of the card.

#### PCI Slot/Card Configurations

<i>Right Side Riser Cards</i>	<i>Expansion card supported</i>
RSC-R1UU-XR	1x PCI-X 133 MHz card
RSC-R1UU-E8R (in accessory box)	1x PCI-Express x8 card
 <i>Left Side Riser Card</i>	 <i>Expansion card supported</i>
CSE-R1UU-2E8	2x PCI-E x8 cards

## 5-7 Serverboard Details

**Figure 5-4. SUPER X7DBU Layout**  
(not drawn to scale)



**Notes:**

Jumpers not noted are for test purposes only.

## X7DBU Quick Reference

<b>Jumper</b>	<b>Description</b>	<b>Default Setting</b>
JBT1	CMOS Clear	(See Section 5-9)
II <sup>2</sup> C1/II <sup>2</sup> C2	I <sup>2</sup> C Enable/Disable	Open (Disabled)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPL1/JPL2	JLAN1/JLAN2 Enable/Disable	Pins 1-2 (Enabled)
JWD	Watch Dog	Pins 1-2 (Reset)

<b>Connector</b>	<b>Description</b>
COM1/COM2	COM1/COM2 Serial Port Connector/Header
FAN 1-8	Fan Headers 1-8
Floppy	Floppy Disk Drive Connector
IDE#1	IDE Hard Drive Connector
JD1	Power LED (pins1-3)/Speaker Header (pins 4-7)
JF1	Front Control Panel Connector
JL1	Chassis Intrusion Header
JK1	Keylock Header
JOH1	Overheat LED
JPW1	Primary 20-Pin ATX Power Connector
JPW2	Auxiliary Power Connector (4-pin)
JPW3	Processor Power Connector (8-pin)
JWOL	Wake-on-LAN Header
JWOR	Wake-on-Ring Header
LAN1/2	Gigabit Ethernet Ports
SATA0~SATA5	Intel (ESB2) SATA Ports
SGPIO1/SGPIO2	SGPIO Headers
SIMSO	IPMI 2.0 (with virtual media over LAN) Slot
SMB	System Management Bus Header
SMBUS_PS	System Management (I <sup>2</sup> C) Power Header
USB0/1	USB Ports
USB2/3	USB2/USB3 Header
USB4	USB4 Header

<b>Other</b>	<b>Description</b>
LE1	Power On LED
LE2	Rear UID LED
SW1	UID (Unit Identifier) Button

## 5-8 Connector Definitions

### ATX Power Connector

The primary ATX power supply connector meets the SSI (Superset ATX) 20-pin specification. Make sure that the orientation of the connector is correct. See the table on the right for pin definitions.

ATX Power 20-pin Connector Pin Definitions (JPW1)			
Pin#	Definition	Pin #	Definition
11	+3.3V	1	+3.3V
12	-12V	2	+3.3V
13	COM	3	COM
14	PS_ON	4	+5V
15	COM	5	COM
16	COM	6	+5V
17	COM	7	COM
18	Res (NC)	8	PWR_OK
19	+5V	9	5VSB
20	+5V	10	+12V

### Auxiliary Power Connector

In addition to the Primary ATX power connector (above), the Auxiliary 4-pin connector at JPW2 must also be connected to your power supply. See the table on the right for pin definitions.

Auxiliary Power Pin Definitions (JPW2)	
Pins	Definition
1 & 2	Ground
3 & 4	+12V

### Processor Power Connector

JPW3 must also be connected to the power supply to provide power for the processor(s). See the table on the right for pin definitions.

Processor Power Pin Definitions (JPW3)	
Pins	Definition
1 through 4	Ground
5 through 8	+12V

### NMI Button

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

NMI Button Pin Definitions (JF1)	
Pin#	Definition
19	Control
20	Ground

### Power LED

The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table on the right for pin definitions.

Power LED Pin Definitions (JF1)	
Pin#	Definition
15	Vcc
16	Control

## HDD LED

The HDD (IDE Hard Disk Drive) LED connection is located on pins 13 and 14 of JF1. Attach the IDE hard drive LED cable to display disk activity. Refer to the table on the right for pin definitions.

HDD LED Pin Definitions (JF1)	
Pin#	Definition
13	Vcc
14	HD Active

## NIC1 LED

The NIC1 (Network Interface Controller) LED connection is located on pins 11 and 12 of JF1. Attach the NIC1 LED cable to display network activity. Refer to the table on the right for pin definitions.

NIC1 LED Pin Definitions (JF1)	
Pin#	Definition
11	Vcc
12	Ground

## NIC2 LED

The NIC2 (Network Interface Controller) LED connection is located on pins 9 and 10 of JF1. Attach the NIC2 LED cable to display network activity. Refer to the table on the right for pin definitions.

NIC2 LED Pin Definitions (JF1)	
Pin#	Definition
9	Vcc
10	Ground

## Universal Information LED

Connect an LED to pins 7 and 8 of JF1 to provide advanced warning of chassis overheating or fan failure. These pins also work with the front UID indicator, which will activate as either a solid or flashing blue LED depending on whether the LED was activated via IPMI or the UID button. Refer to the tables on the right for pin definitions and status indicators.

Universal Info. LED Pin Definitions (JF1)	
Pin#	Definition
7	Vcc
8	Control

Red LED Indications	
State	Indication
Solid	Overheat
Blinking (fast)	Power Fail
Blinking (slow)	Fan fail

Blue LED Indications	
State	Indication
Solid	UID (via Button)
Blinking	UID (via IPMI)

## Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions.

Power Fail LED Pin Definitions (JF1)	
Pin#	Definition
5	Vcc
6	Ground

## Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to the hardware reset switch on the computer case. Refer to the table on the right for pin definitions.

Reset Button Pin Definitions (JF1)	
Pin#	Definition
3	Reset
4	Ground

## Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (see the Power Button Mode setting in BIOS). To turn off the power when set to suspend mode, depress the button for at least 4 seconds. Refer to the table on the right for pin definitions.

Power Button Pin Definitions (JF1)	
Pin#	Definition
1	PW_ON
2	Ground

## Universal Serial Bus (USB0/1)

Two Universal Serial Bus ports are located on the I/O backplane. USB0 is the bottom connector and USB1 is the top connector. See the table on the right for pin definitions.

Universal Serial Bus Pin Definitions (USB0/1)			
USB0		USB1	
Pin #	Definition	Pin #	Definition
1	+5V	1	+5V
2	PO-	2	PO-
3	PO+	3	PO+
4	Ground	4	Ground
5	N/A	5	Key



## Universal Serial Bus Headers

Three additional USB headers (USB2/USB3 and USB4) are included on the serverboard. These may be used for front side access. A USB cable (not included) is needed for the connection. See the table on the right for pin definitions.

Universal Serial Bus Headers Pin Definitions (USB2, USB3, USB4)			
USB2		USB3, USB4	
Pin #	Definition	Pin #	Definition
1	+5V	1	+5V
2	PO-	2	PO-
3	PO+	3	PO+
4	Ground	4	Ground
5	Key	5	NC

## Serial Ports

The COM1 serial port is located on the IO backplane. COM2 is a header on the serverboard (see serverboard layout for location). See the table on the right for pin definitions.

Serial Port Pin Definitions (COM1, COM2)			
Pin #	Definition	Pin #	Definition
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground	10	NC

**Note:** Pin 10 is included on the header but not on the port. NC indicates no connection.

## Fan Headers

The X7DBU has five eight headers, designated Fan1 through Fan8. FAN5 through FAN8 are for 4-pin Pulse Width Modulated (PWM) fans and are to be connected to the CPU heatsink fans. Their speed is controlled via Thermal Management with a BIOS setting. FAN1 through FAN4 are 3-pin, non-PWM fans. See the tables on the right for pin definitions.

4-pin Fan Header Pin Definitions (FAN5-8)	
Pin#	Definition
1	Ground (Black)
2	+12V (Red)
3	Tachometer
4	PWM Control

3-pin Fan Header Pin Definitions (FAN1-FAN4)	
Pin#	Definition
1	Ground (Black)
2	+12V (Red)
3	Tachometer

## Chassis Intrusion

A Chassis Intrusion header is located at JL1. Attach the appropriate cable to inform you of a chassis intrusion.

Chassis Intrusion Pin Definitions (JL1)	
Pin#	Definition
1	Intrusion Input
2	Ground

## Power LED/Speaker

On the JD1 header, pins 1-3 are for a power LED, pins 4-7 are for the speaker. See the table on the right for speaker pin definitions.

**Note:** The speaker connector pins are for use with an external speaker. If you wish to use the onboard speaker, you should close pins 6-7 with a jumper.

Speaker Connector Pin Definitions (JD1)		
Pin #	Function	Definition
4	+	Speaker data (red wire)
5	Key	No connection
6		Key
7		Speaker data

## ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse ports are located beside the USB ports. See the table on the right for pin definitions.

PS/2 Keyboard and Mouse Ports Pin Definitions	
Pin#	Definition
1	Data
2	NC
3	Ground
4	VCC
5	Clock
6	NC

## Overheat LED

Connect an LED to the JOH1 header to provide warning of a chassis overheating condition. See the table on the right for pin definitions.

Overheat LED Pin Definitions (JOH1)	
Pin#	Definition
1	+5V
2	OH Active

## Wake-On-LAN

The Wake-On-LAN header is designated JWOL. See the table on the right for pin definitions. You must enable the LAN Wake-Up setting in BIOS to use this feature. You must also have a LAN card with a Wake-on-LAN connector and cable.

Wake-On-LAN Pin Definitions (JWOL)	
Pin#	Definition
1	+5V Standby
2	Ground
3	Wake-up

## Wake-On-Ring

The Wake-On-Ring header is designated JWOR. This function allows your computer to receive and "wake-up" by an incoming call to the modem when in suspend state. See the table on the right for pin definitions. You must have a WOR card and cable to use this feature.

Wake-On-Ring Pin Definitions (JWOR)	
Pin#	Definition
1	Ground (Black)
2	Wake-up

## SMB

The System Management Bus header (for the PCI bus) is designated SMB. Connect the appropriate cable here to utilize SMB on your system. See the table on the right for pin definitions.

SMB Header Pin Definitions (SMB)	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection

## SMBUS\_PS

This header is for I<sup>2</sup>C, which may be used to monitor the status of the power supply. See the table on the right for pin definitions.

SMBUS_PS (I <sup>2</sup> C) Pin Definitions	
Pin#	Definition
1	Clock
2	SMB Data
3	N/A
4	N/A
5	N/A

## JLAN1/2 (Ethernet Ports)

Two Ethernet ports (designated JLAN1 and JLAN2) are located beside the VGA port on the I/O backplane. These ports accept RJ45 type cables.



## Alarm Reset (JAR)

The system will notify you in the event of a power supply failure. This feature assumes that Supermicro redundant power supply units are installed in the chassis. Connect a microswitch to the JAR header to disable the power supply fail alarm.

Alarm Reset Pin Definitions (JAR)	
Pin#	Definition
2	+5V
1	Ground

## SGPIO

The two headers labeled SGPIO1 and SGPIO2 are for SGPIO (Serial General Purpose Input/Output). SGPIO provides a bus between the SATA controller and the SATA drive backplane to provide SATA enclosure management functions. Connect the appropriate cables from the backplane to the SGPIO1 and SGPIO2 headers to utilize SATA management functions on your system.

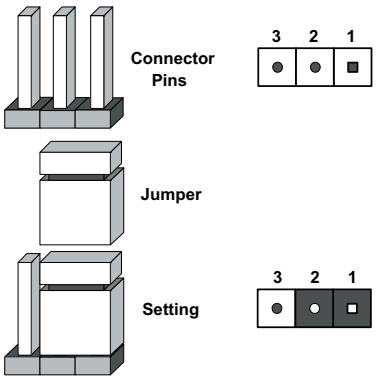
SGPIO Header Pin Definitions (SGPIO1, SGPIO2)			
Pin#	Definition	Pin #	Definition
1	NC	2	NC
3	Ground	4	Data
5	Load	6	Ground
7	NC	8	NC

**Note:** NC indicates no connection.

# 5-9 Jumper Settings

## Explanation of Jumpers

To modify the operation of the serverboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram at right for an example of jumping pins 1 and 2. Refer to the serverboard layout page for jumper locations.



**Note:** On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

## CMOS Clear

JBT1 is used to clear CMOS and will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To clear CMOS,

- 1) First power down the system and unplug the power cord(s)
- 2) With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver
- 3) Remove the screwdriver (or shorting device)
- 4) Reconnect the power cord(s) and power on the system.

**Note:** Do not use the PW\_ON connector to clear CMOS.

## VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings.

VGA Enable/Disable Jumper Settings (JPG1)	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

### LAN Enable/Disable

Change the setting of jumper JPL1 or JPL2 to enable or disable the onboard Ethernet (RJ45) ports LAN1 and LAN2, respectively. See the table on the right for jumper settings. The default setting is enabled

LAN Enable/Disable Jumper Settings (JPL1, JPL2)	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

### Watch Dog Enable/Disable

JWD controls the Watch Dog function. Watch Dog is a system monitor that can reboot the system when a software application is “hung up”. Pins 1-2 will cause WD to reset the system if an application is hung up. Pins 2-3 will generate a non-maskable interrupt signal for the application that is hung up. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

**Note:** When enabled, the user needs to write their own application software to disable the Watch Dog Timer.

Watch Dog Jumper Settings (JWD)	
Jumper Setting	Definition
Pins 1-2	Reset
Pins 2-3	NMI
Open	Disabled

### I<sup>2</sup>C Enable/Disable

II<sup>2</sup>C1 and II<sup>2</sup>C2 are used to enable or disable I<sup>2</sup>C bus on the serverboard. See the table on the right for jumper settings. Both jumpers must be set the same for the setting to function correctly (one jumper enables the clock and the other enables the data). The default setting is disabled.

I <sup>2</sup> C Bus Enable/Disable Jumper Settings (II <sup>2</sup> C1, II <sup>2</sup> C2)	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

## 5-10 Onboard Indicators

### LAN1/LAN2 LEDs

The Ethernet ports (located beside the VGA port) have two LEDs. On each Gigabit LAN port, one LED indicates activity when blinking while the other LED may be green, amber or off to indicate the speed of the connection. See the table on the right for the functions associated with the connection speed LED.

LAN LED Connection Speed Indicator	
LED Color	Definition
Off	10 MHz
Green	100 MHz
Amber	1 GHz

### LE1

The LE1 LED located near JD1 is the power LED. LE1 illuminates when the serverboard is powered up and operating.

### LE2

The LE2 LED located under SW1 is the UID indicator LED. LE2 illuminates when UID is initiated either by the UID button or via IPMI. If initiated a second time, LE2 will turn off.

When the LED blinks blue it means the signal was initiated via IPMI. If blue continuously it means the UID button initiated it.

## 5-11 Floppy, IDE and SATA Drive Connections

Note the following when connecting the floppy and hard disk drive cables:

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

### Floppy Connector

The floppy connector is designated Floppy. See the table below for pin definitions.

Floppy Drive Connector Pin Definitions (Floppy)			
Pin#	Definition	Pin #	Definition
1	Ground	2	FDHDIN
3	Ground	4	Reserved
5	Key	6	FDEDIN
7	Ground	8	Index
9	Ground	10	Motor Enable
11	Ground	12	Drive Select B
13	Ground	14	Drive Select B
15	Ground	16	Motor Enable
17	Ground	18	DIR
19	Ground	20	STEP
21	Ground	22	Write Data
23	Ground	24	Write Gate
25	Ground	26	Track 00
27	Ground	28	Write Protect
29	Ground	30	Read Data
31	Ground	32	Side 1 Select
33	Ground	34	Diskette



## IDE Connector

There are no jumpers to configure the onboard IDE#1 connector. See the table on the right for pin definitions.

IDE Drive Connector Pin Definitions (IDE#1)			
Pin#	Definition	Pin #	Definition
1	Reset IDE	2	Ground
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	Ground	20	Key
21	DRQ3	22	Ground
23	I/O Write	24	Ground
25	I/O Read	26	Ground
27	IOCHRDY	28	BALE
29	DACK3	30	Ground
31	IRQ14	32	IOCS16
33	Addr1	34	Ground
35	Addr0	36	Addr2
37	Chip Select 0	38	Chip Select 1
39	Activity	40	Ground

## SATA Ports

See the table on the right for pin definitions for the onboard SATA ports.

SATA Port Pin Definitions (SATA0 ~ SATA5)	
Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

**Notes**

## Chapter 6

### Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC812L-520U chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the next step.

#### Tools Required

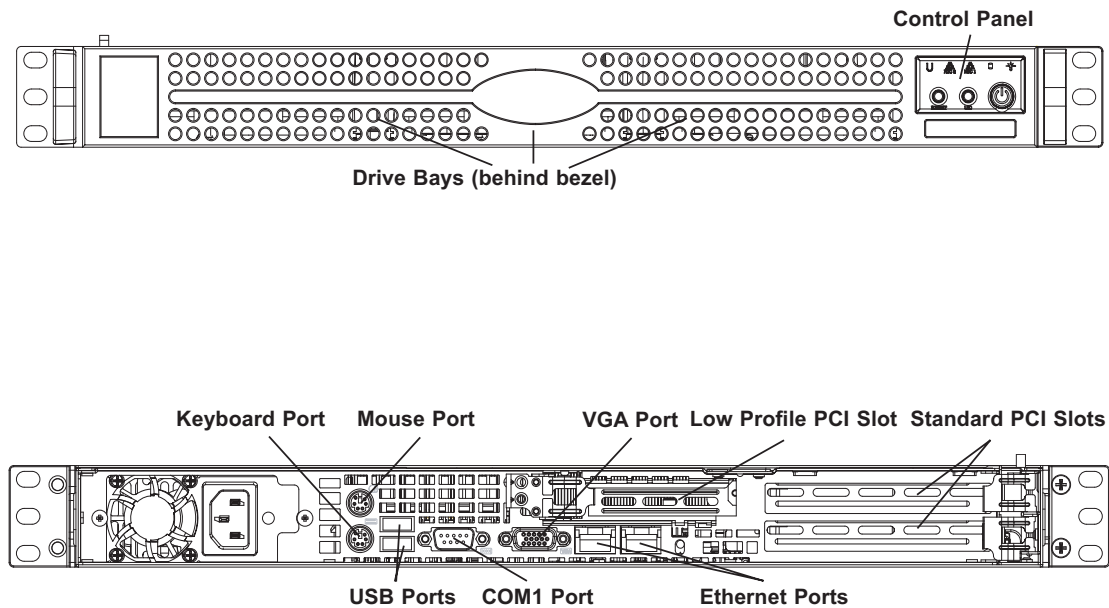
The only tool you will need to install components and perform maintenance is a Philips screwdriver.

### 6-1 Static-Sensitive Devices

Electrostatic discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD damage.

#### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

**Figure 6-1. Chassis: Front and Rear Views**

## 6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system status indications. A ribbon cable has bundled these wires together to simplify the connection. Connect the cable from JF1 on the serverboard to the appropriate header on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path.

The control panel LEDs inform you of system status. See "Chapter 3: System Interface" for details on the LEDs and the control panel buttons. Details on JF2 can be found in "Chapter 5: Advanced Serverboard Installation."

## 6-3 System Fans

Two 10-cm blower fans provide all the cooling needed for the SuperServer 6015B-Ni. It is very important that the chassis top cover is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis and cool the components. See Figure 6-2.

### System Fan Failure

If a fan fails, the ambient air temperature in the chassis will rise and activate the overheat LED on the control panel. Replace any failed fan immediately with the same type and model.

### Replacing System Fans

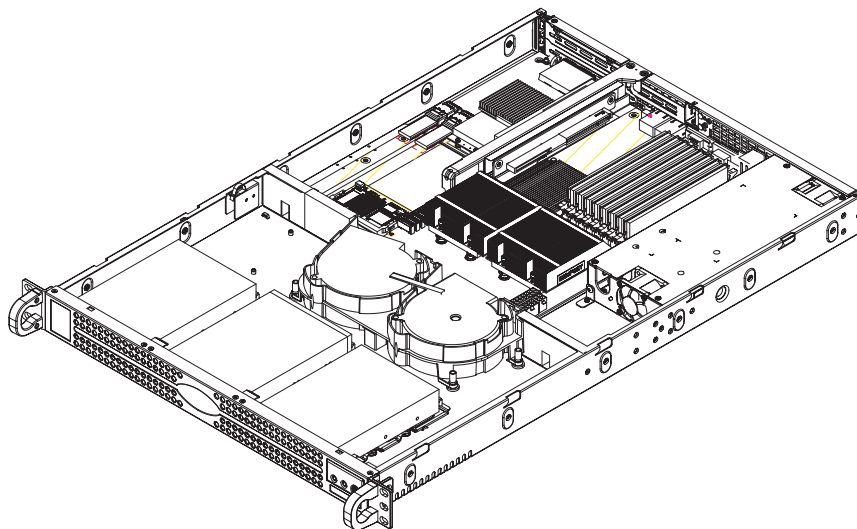
#### 1. Removing a fan

Power down the server (and remove the power cord as a safety precaution). Remove the chassis cover and detach the fan wires from their connection to the serverboard. Remove the screws that secure the fan to the chassis and lift the blower fan out.

#### 2. Installing a new fan

Replace the failed fan with an identical 10-cm 12 volt fan (available from Supermicro: p/n FAN-0059L). Install the new fan in its proper place in the chassis by positioning it on the two mounting posts. Secure the fan to the chassis with the screws you removed previously, then attach the fan wires to the correct fan header on the serverboard. Finish by replacing the chassis cover and power cord and restoring power to the system.

**Figure 6-2. System Cooling Fans**



## 6-4 Drive Bay Installation/Removal

### Accessing the Drive Bays

To install/remove a disk drive in one of the IDE drive bays, you will need to gain access to the inside of the 6015B-Ni by removing the top cover of the chassis (see Figure 6-3).

Figure 6-3. Removing the Top Chassis Cover

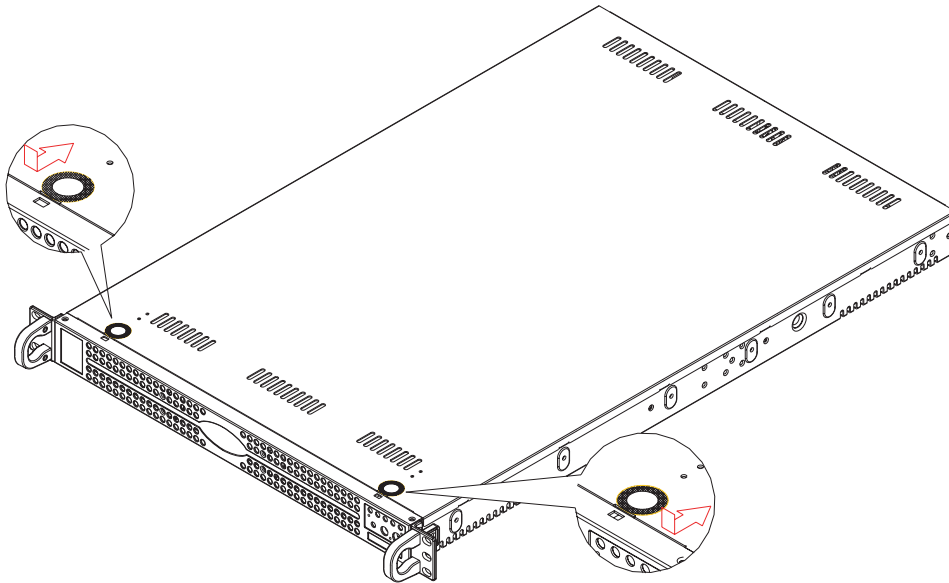
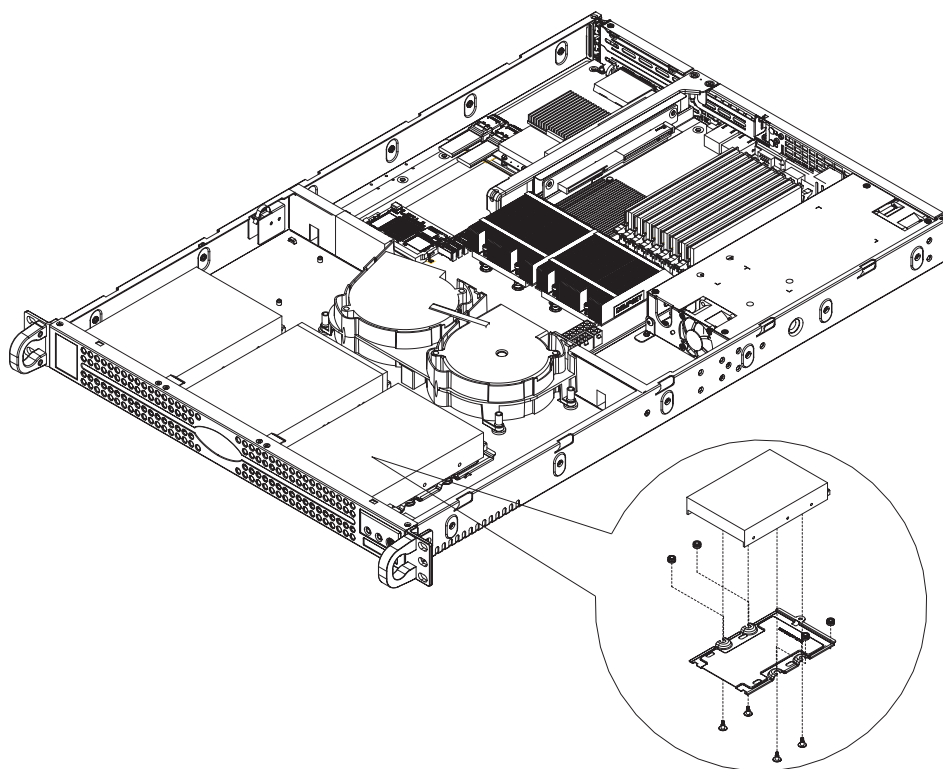


Figure 6-4. IDE Drive Bay Removal



## Installing Components in the 3.5" Drive Bays

### 1. Drive bay configuration

The 6015B-Ni has three 3.5" drive bays designed to house hard disk drives.

### 2. Mounting components in the drive bays

First power down the system, remove the AC power cord from the power supply and then remove the top chassis cover to access the drive bays. With the cover off, remove the single screw that secures the drive carrier to the chassis then push the entire empty drive carrier out from the back (see Figure 6-4).

Adding a hard disk drive: to add a hard disk drive, install it into one of the removed empty drive carriers with the printed circuit board side toward the carrier (down) so that the drive's mounting holes align with those in the carrier. Secure the drive to the carrier with the screws, then slide the assembly into the bay and secure it to the chassis with the drive carrier screw you first removed. Attach the power and data cables to the drive. Replace the top chassis cover and the AC power cord before restoring power to the system.

**Note:** A red wire typically designates the location of pin 1. You should keep the drive carriers installed in any unused drive bays (even if empty) to reduce EMI and noise and to facilitate the airflow inside the chassis.

## 6-5 Power Supply

The SuperServer 6015B-Ni has a single 520 watt power supply, which is auto-switching capable. This enables it to automatically sense and operate with a 100V to 240V input voltage. A power on/off switch is included on the back of the unit. This switch should be turned to the off position before removing the power cord when replacing the unit.

### Power Supply Failure

If the power supply unit fails, the system will shut down and you will need to replace the power supply unit. Replacement units can be ordered directly from Supermicro (see contact information in the Preface). As there is only one power supply unit in the 6015B-Ni, the server must be powered down before removing and replacing the power supply unit for whatever reason.

### Removing/Replacing the Power Supply

#### 1. Removing the power supply

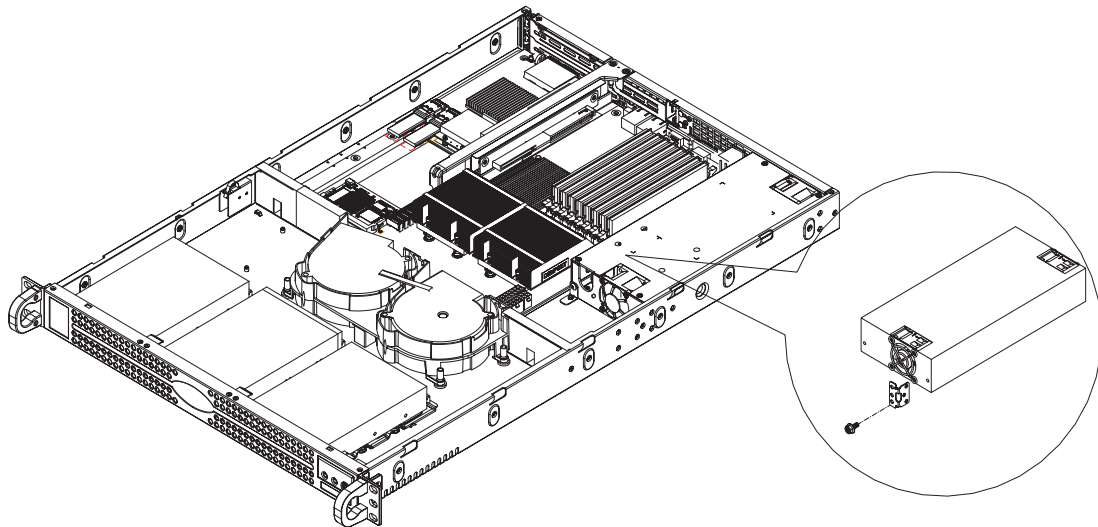
First turn the power switch on the control panel and the switch on the power supply off, then unplug the power cord from the system and all peripheral devices. Remove the chassis cover by pressing the two release buttons on the top of the chassis (near the front) and push the chassis top rearward about one inch before lifting it completely off. To remove the failed power unit, unplug the power cables from the connections on the serverboard. Then unscrew the bracket securing the power supply to the chassis and lift it out. See Figure 6-5.

#### 2. Installing a new power supply

Replace the failed unit with another unit of the same input voltage, output voltage and wattage. It is highly recommended to replace it with exactly the same model power supply (Supermicro part number PWS-521-1H20). Carefully insert the new unit into position and screw it into the chassis. Plug the power cables back into their connectors on the serverboard. Replace the chassis top cover and reposition the unit back into the rack. Reconnect the power cord and turn the switch on the back of the power supply to the on position. Finish by depressing the power button on the chassis front control panel.



**Figure 6-5. Removing/Replacing the Power Supply**



**Notes**

## Chapter 7

### BIOS

#### 7-1 Introduction

This chapter describes the Phoenix BIOS™ Setup utility for the X7DBU. The Phoenix ROM BIOS is stored in a flash chip and can be easily upgraded using a floppy disk-based program.

**Note:** Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Please refer to the Manual Download area of the Supermicro web site <<http://www.supermicro.com>> for any changes to the BIOS that may not be reflected in this manual.

#### System BIOS

The BIOS is the Basic Input Output System used in all IBM® PC, XT™, AT®, and PS/2® compatible computers. The Phoenix BIOS stores the system parameters, types of disk drives, video displays, etc. in the CMOS. The CMOS memory requires very little electrical power. When the computer is turned off, a backup battery provides power to the CMOS Logic, enabling it to retain system parameters. Each time the computer is powered on the computer is configured with the values stored in the CMOS Logic by the system BIOS, which gains control at boot up.

#### How To Change the Configuration Data

The CMOS information that determines the system parameters may be changed by entering the BIOS Setup utility. This Setup utility can be accessed by pressing the <Delete> key at the appropriate time during system boot. (See below.)

#### Starting the Setup Utility

Normally, the only visible POST (Power On Self Test) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Security and Power menus. Beginning with Section 7-3, detailed descriptions are given for each parameter setting in the Setup utility.



**Warning:** Do not shut down or reset the system while updating BIOS to prevent possible boot failure.

## 7-2 Running Setup

*Default settings are in bold text unless otherwise noted.*

The BIOS setup options described in this section are selected by choosing the appropriate text from the main BIOS Setup screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options (See the next page).

When you first power on the computer, the Phoenix BIOS™ is immediately activated.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing <Delete> immediately after turning the system on, or
2. When the message shown below appears briefly at the bottom of the screen during the POST (Power On Self-Test), press the <Delete> key to activate the main Setup menu:

**Press the <Delete> key to enter Setup**

## 7-3 Main BIOS Setup

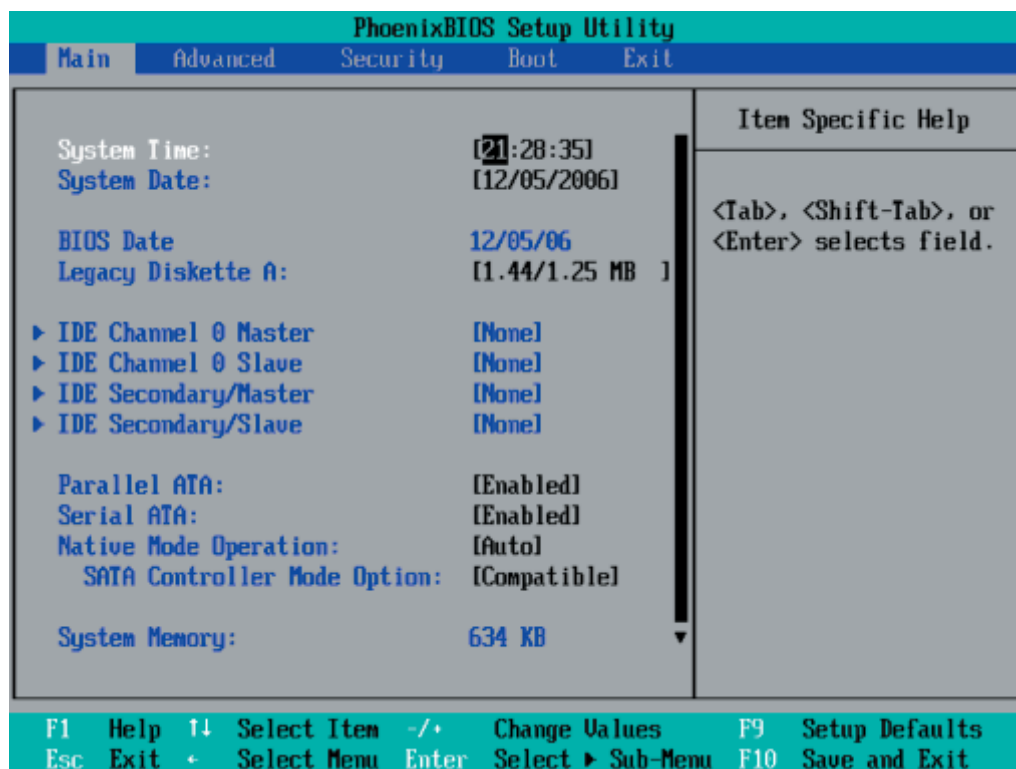
All main Setup options are described in this section. The main BIOS Setup screen is displayed below.

Use the Up/Down arrow keys to move among the different settings in each menu. Use the Left/Right arrow keys to change the options for each setting.

Press the <Esc> key to exit the CMOS Setup Menu. The next section describes in detail how to navigate through the menus.

Items that use submenus are indicated with the ► icon. With the item highlighted, press the <Enter> key to access the submenu.

## Main BIOS Setup Menu



## Main Setup Features

### System Time

To set the system date and time, key in the correct information in the appropriate fields. Then press the <Enter> key to save the data.

### System Date

Using the arrow keys, highlight the month, day and year fields, and enter the correct data. Press the <Enter> key to save the data.

### BIOS Date

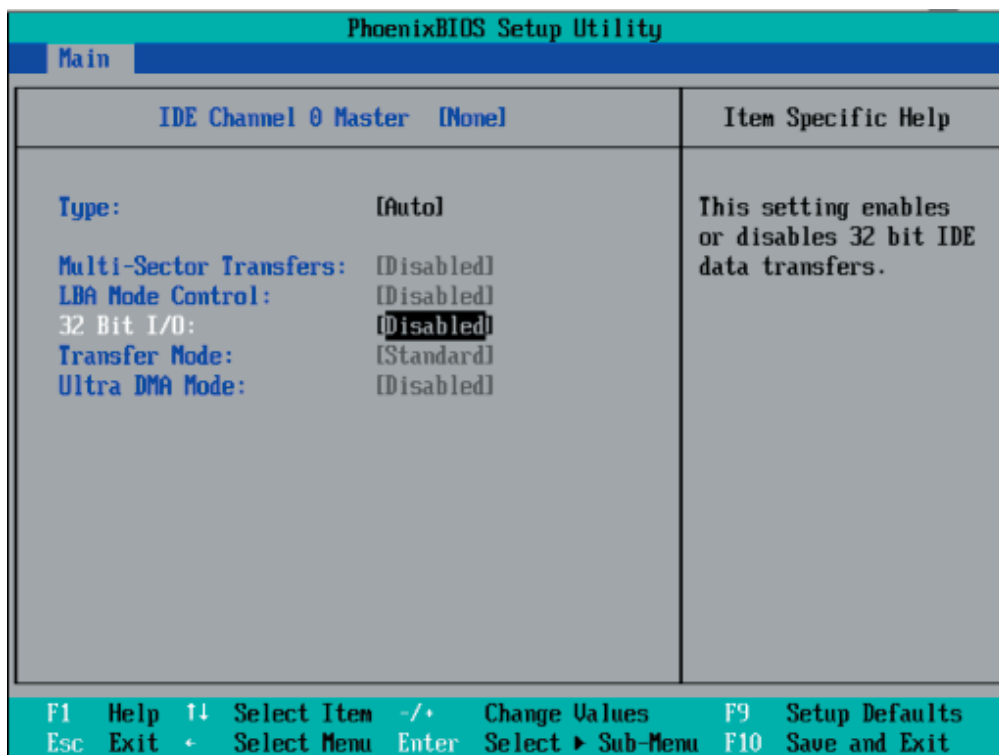
This field displays the date when this version of BIOS was built.

### Legacy Diskette A

This setting allows the user to set the type of floppy disk drive installed as diskette A. The options are Disabled, 360Kb 5.25 in, 1.2MB 5.25 in, 720Kb 3.5 in, **1.44/1.25MB**, 3.5 in and 2.88MB 3.5 in.

## ►IDE Channel 0 Master/Slave and Secondary IDE Master/Slave

These settings allow the user to set the parameters of IDE Channel 0 Master/Slave and Secondary IDE Master/Slave slots. Press <Enter> to activate the following submenu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the submenu are:



The following items will be displayed in the submenu:

### Type

Selects the type of IDE hard drive. The option **Auto** will allow the BIOS to automatically configure the parameters of the HDD installed at the connection. Enter a number between 1 to 39 to select a predetermined HDD type. Select User to allow the user to enter the parameters of the HDD installed. Select CDROM if a CDROM drive is installed. Select ATAPI if a removable disk drive is installed.

### **Multi-Sector Transfers**

This item allows the user to specify the number of sectors per block to be used in multi-sector transfer. The options are **Disabled**, 4 Sectors, 8 Sectors, and 16 Sectors.

### **LBA Mode Control**

This item determines whether the Phoenix BIOS will access the IDE Channel 0 Master Device via the LBA mode. The options are Enabled and **Disabled**.

### **32 Bit I/O**

This option allows the user to enable or disable the function of 32-bit data transfer. The options are Enabled and **Disabled**.

### **Transfer Mode**

This option allows the user to set the transfer mode. The options are **Standard**, Fast PIO1, Fast PIO2, Fast PIO3, Fast PIO4, FPIO3/DMA1 and FPIO4/DMA2.

### **Ultra DMA Mode**

This option allows the user to select Ultra DMA Mode. The options are **Disabled**, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4, and Mode 5.

## Parallel ATA

This setting allows the user to enable or disable the function of Parallel ATA. The options are **Enabled** and Disabled.

## Serial ATA

This setting allows the user to enable or disable the function of Serial ATA. The options are Disabled and **Enabled**.

## Native Mode Operation

Select the native mode for ATA. The options are: Serial ATA, and **Auto**.

## SATA Controller Mode

Select **Compatible** to allow the SATA and PATA drives to be automatically-detected and be placed in the Legacy Mode by the BIOS. Select Enhanced to allow the SATA and PATA drives to be to be automatically-detected and be placed in the Native IDE Mode. (**Note: The Enhanced mode is supported by the Windows 2000 OS or a later version.**)

When the SATA Controller Mode is set to Enhanced, the following items will display:

### Serial ATA (SATA) RAID Enable

Select Enable to enable SerialATA RAID Functions. (For the Windows OS environment, use the RAID driver if this feature is set to Enabled. When this item is set to Enabled, the item: "ICH RAID Code Base" will be available for you to select either Intel or Adaptec Host RAID firmware. If this item is set to **Disabled**, the item-SATA AHCI Enable will be available.) The options are Enabled and **Disabled**.

### ICH RAID Code Base (Available when SATA RAID is Enabled.)

Select Intel to enable Intel's SATA RAID firmware. Select Adaptec to use Adaptec's HostRAID firmware. The options are **Intel** and Adaptec.

### SATA AHCI (Available when SATA RAID is Disabled.)

Select Enable to enable the function of Serial ATA Advanced Host Interface. (Take caution when using this function. This feature is for advanced programmers only. The options are Enabled and **Disabled**.)

## System Memory

This display informs you how much system memory is recognized as being present in the system.

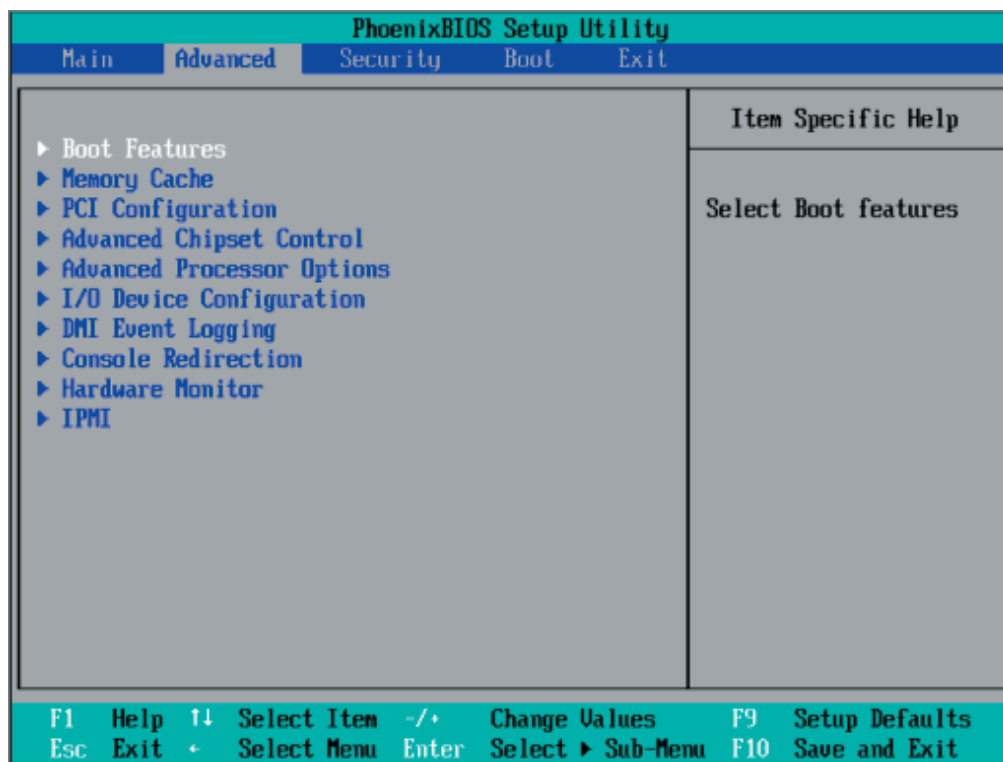
## Extended Memory

This display informs you how much extended memory is recognized as being present in the system.



## 7-4 Advanced Setup

Choose Advanced from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. The items with a triangle beside them have submenus that can be accessed by highlighting the item and pressing <Enter>.



### ▶ Boot Features

Access the submenu to make changes to the following settings.

#### QuickBoot Mode

If enabled, this feature will speed up the POST (Power On Self Test) routine by skipping certain tests after the computer is turned on. The settings are **Enabled** and Disabled. If Disabled, the POST routine will run at normal speed.

#### QuietBoot Mode

This setting allows you to **Enable** or Disable the graphic logo screen during boot-up.

#### POST Errors

Set to **Enabled** to display POST Error Messages if an error occurs during bootup. If set to Disabled, the system will continue to boot without displaying any error messages even when a boot error occurs.

#### ACPI Mode

Use the setting to determine if you want to employ ACPI (Advanced Configuration and Power Interface) power management on your system. The options are **Yes** and No.

### Power Button Behavior

If set to **Instant-Off**, the system will power off immediately as soon as the user hits the power button. If set to 4-sec., the system will power off when the user presses the power button for 4 seconds or longer. The options are instant-off and 4-sec override.

### Resume On Modem Ring

Select On to “wake your system up” when an incoming call is received by your modem. The options are On and **Off**.

### Power Loss Control

This setting allows you to choose how the system will react when power returns after an unexpected loss of power. The options are Stay Off, Power On, and **Last State**.

### Watch Dog

If enabled, this option will automatically reset the system if the system is not active for more than 5 minutes. The options are Enabled and **Disabled**.

### Summary Screen

This setting allows you to **Enable** or Disable the summary screen which displays the system configuration during bootup.

## ►Memory Cache

### Cache System BIOS Area

This setting allows you to designate a reserve area in the system memory to be used as a System BIOS buffer to allow the BIOS to write (cache) data into this reserved memory area. Select **Write Protect** to enable this function, and this area will be reserved for BIOS ROM access only. Select Uncached to disable this function and make this area available for other devices.

### Cache Video BIOS Area

This setting allows you to designate a reserve area in the system memory to be used as a Video BIOS buffer to allow the BIOS to write (cache) data into this reserved memory area. Select **Write Protect** to enable the function and this area will be reserved for Video BIOS ROM access only. Select Uncached to disable this function and make this area available for other devices.

### Cache Base 0-512K

If enabled, this feature will allow the data stored in the base memory area: block 0-512K to be cached (written) into a buffer, a storage area in Static DROM (SDROM) or to be written into L1, L2 cache inside the CPU to speed up CPU operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time.

Select Write Protect to prevent data from being written into the base memory area of Block 0-512K. Select Write Back to allow CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

### **Cache Base 512K-640K**

If enabled, this feature will allow the data stored in the memory area: 512K-640K to be cached (written) into a buffer, a storage area in the Static DROM (SDROM) or written into L1, L2, L3 cache inside the CPU to speed up CPU operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time. Select Write Protect to prevent data from being written into the base memory area of Block 512-640K. Select Write Back to allow CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

### **Cache Extended Memory**

If enabled, this feature will allow the data stored in the extended memory area to be cached (written) into a buffer, a storage area in Static DROM (SDROM) or written into L1, L2, L3 cache inside the CPU to speed up CPU operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time. Select Write Protect to prevent data from being written into the system memory area above 1MB. Select Write Back to allow CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

### **Discrete MTRR Allocation**

If enabled, MTRRs (-Memory Type Range Registers) are configured as distinct, separate units and cannot be overlapped. Set to Enabled to enhance graphic performance when using a Linux graphic driver that requires write-combining configuration with 4GB or more memory. The options are Enabled and **Disabled**.

### **►PCI Configuration**

Access the submenu to make changes to the following settings for PCI devices.

### **Onboard GLAN1/Onboard GLAN2 (Gigabit- LAN) OPROM Configure**

Enabling this option provides the capability to boot from the GLAN port specified. The options are **Disabled** and Enabled.

### **Default Primary Video Adapter**

This feature allows the user to specify which video adapter to be used as the default primary video adapter--the onboard video adapter or others. The options are Other and **Onboard Video**.

---

### Emulated IRQ Solutions

When Enabled, Emulated IRQ Scheme allows PCI devices to run on legacy operating systems that use the MSI mechanism to generate INTX compatible interrupts. The options are **Disabled** and **Enabled**.

### PCI-Exp. I/O Performance

Some add-on cards perform faster with the coalesce feature, which limits the payload size to 128 Bytes; while others perform faster with a payload size of 256 Bytes which inhibits coalesce features. Please refer to your add-on card user guide for the desired setting. The options are Payload (256 Bytes) and **Coalesce Enabled (128 Bytes)**.

### PCI Parity Error Forwarding

The feature allows SERR and PERR errors detected in PCI slots to be sent (forwarded) to the BIOS DMI Event Log for the user to review. The options are **Enabled** and **Disabled**.

### ROM Scan Ordering

This feature allows the user to decide which Option ROM to be activated first. The options are **Onboard first** and **Add-On first**.

### PCI Fast Delayed Transaction

Enable this function to improve DMA data transfer rate for a PCI 32-bit multimedia card. The options are **Enable** and **Disabled**.

### Reset Configuration Data

If set to Yes, this setting clears the Extended System Configuration Data- (ESCD) area. The options are **Yes** and **No**.

### Frequency for PCI-X#2

This option allows the user to change the bus frequency for the devices installed in the slot indicated. The options are **Auto**, PCI 33 MHz, PCI 66 MHz, PCI-X 66 MHz, PCI-X 100 MHz and PCI-X 133 MHz.

### ►Slot1 Blue Slot PCI-Exp. x8, L2 Slot PCI-Exp. x8, R1 Slot PCI-X 133 MHz, R2 Slot PCI-Exp. x8/x4 and R3 Slot PCI-Exp. x4

Access the submenu for each of the settings above to make changes to the following:

#### Option ROM Scan

When enabled, this setting will initialize the device expansion ROM. The options are **Enabled** and **Disabled**.

### Enable Master

This setting allows you to enable the selected device as the PCI bus master. The options are **Enabled** and Disabled.

### Latency Timer

This setting allows you to set the clock rate for Bus Master. A high-priority, high-throughput device may benefit from a greater clock rate. The options are **Default**, 0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, and 00E0h. For Unix, Novell and other Operating Systems, please select the option: other. If a drive fails after the installation of a new software, you might want to change this setting and try again. A different OS requires a different Bus Master clock rate.

### Large Disk Access Mode

This setting determines how large hard drives are to be accessed. The options are **DOS** or Other (for Unix, Novelle NetWare and other operating systems).

### ► Advanced Chipset Control

Access the submenu to make changes to the following settings.



**Warning:** Take caution when changing the Advanced settings. Incorrect values entered may cause system malfunction. Also, a very high DRAM frequency or incorrect DRAM timing may cause system instability. When this occurs, revert to the default setting.

### SERR Signal Condition

This setting specifies the ECC Error conditions that an SERR# is to be asserted. The options are None, **Single Bit**, Multiple Bit, and Both.

### 4GB PCI Hole Granularity

This feature allows you to select the granularity of PCI hole for PCI slots. If MTRRs are not enough, this option may be used to reduce MTRR occupation. The options are: **256 MB**, 512 MB, 1GB and 2GB.

### Memory Branch Mode

This option determines how the two memory branches operate. System address space can either be interleaved between the two branches or Sequential from one branch to another. Mirror mode allows data correction by maintaining two copies of data in two branches. Single Channel 0 allows a single DIMM population during system manufacturing. The options are **Interleave**, Sequential, Mirroring, and Single Channel 0.

### Branch 0 Rank Interleaving & Sparing

Select enable to enable the functions of Memory Interleaving and Memory Sparing for Branch 0 Rank. The options for Memory Interleaving are 1:1, 2:1 and **4:1**. The options for Sparing are Enabled and **Disabled**.

### **Branch 1 Rank Interleaving & Sparing**

Select enable to enable the functions of Memory Interleaving and Memory Sparing for Branch 1 Rank. The options for Memory Interleaving are 1:1, 2:1 and **4:1**. The options for Sparing are Enabled and **Disabled**.

### **Enhanced x8 Detection**

Select **Enabled** to enable Enhanced x8 DRAM UC Error Detection. The options are Disabled and **Enabled**.

### **High Temperature DRAM Operation**

When set to Enabled, the BIOS will refer to the SPD table to set the maximum DRAM temperature. If disabled, the BIOS will set the maximum DRAM temperature based on a predefined value. The options are Enabled and **Disabled**.

### **AMB Thermal Sensor**

Select Enabled to activate the thermal sensor embedded in the Advanced Memory Buffer on a fully buffered memory module for thermal monitoring. The options are **Disabled** and Enabled.

### **Thermal Throttle**

Select Enabled to enable closed-loop thermal throttling on a fully buffered (FBD) memory module. In the closed-loop thermal environment, thermal throttling will be activated when the temperature of the FBD DIMM module exceeds a predefined threshold. The options are Enabled and **Disabled**.

### **Global Activation Throttle**

Select Enabled to enable open-loop global thermal throttling on a fully buffered (FBD) memory module to make it active whenever the number of activate control exceeds a predefined number. The options are Enabled and **Disabled**.

### **Crystal Beach Features**

This feature was designed to implement Intel's I/O AT (Acceleration Technology) to accelerate the performance of TOE devices. (ATOE device is a specialized, dedicated processor that is installed on an add-on card or a network card to handle some or all packet processing of the add-on card. For this motherboard, the TOE device is built inside the ESB2 South Bridge chip.) Options are **Enabled** and Disabled.

### **Route Port 80h Cycles to**

This feature allows the user to decide which bus to send debug information to. The options are PCI and **LPC**.

### **Clock Spectrum Feature**

If Enabled, the BIOS will monitor the level of Electromagnetic Interference caused by the components and will attempt to decrease the interference whenever needed. The options are Enabled and **Disabled**.

## Enabling Multi-Media Timer

Select Yes to activate a set of timers that are alternative to the traditional 8254 timers for the OS use. The options are Yes and **No**.

## USB Function

Select Enabled to enable the function of USB devices specified. The settings are **Enabled** and Disabled.

## Legacy USB Support

This setting allows you to enable support for Legacy USB devices. The settings are **Enabled** and Disabled.

## ►Advanced Processor Options

Access the submenu to make changes to the following settings.

### CPU Speed

This is a display that indicates the speed of the installed processor.

### Frequency Ratio (Available when supported by the CPU.)

The feature allows the user to set the internal frequency multiplier for the CPU. The options are: **Default** and x12.

### Hyperthreading (Available when supported by the CPU.)

Set to Enabled to use the Hyperthreading Technology, which will result in increased CPU performance. The options are Disabled and **Enabled**.

### Machine Checking (Available when supported by the CPU.)

Set to Enabled to use this function which will allow the CPU to detect and report hardware (machine) errors via a set of model-specific registers (MSRs). The options are Disabled and **Enabled**.

### C1 Enhanced Mode (Available when supported by the CPU.)

Set to Enabled to enable Enhanced Halt State to lower CPU voltage/frequency to prevent overheat. The options are Enabled and **Disabled**. (Note: please refer to Intel's web site for detailed information.)

### Execute Disable Bit (Available when supported by the CPU.)

Set to Enabled to allow the processor to classify areas in memory where an application code can execute and where it cannot, and thus preventing a worm or a virus from inserting and creating a flood of codes to overwhelm the processor or damage the system during an attack. **Note:** this feature is available when your OS and your CPU support the function of Execute Disable Bit. The options are **Disabled** and Enabled. (For more information regarding hardware/software support for this function, please refer to Intel's and Microsoft's web sites.)

**Adjacent Cache Line Prefetch (Available when supported by the CPU.)**

The CPU fetches the cache line for 64 bytes if this option is set to Disabled. The CPU fetches both cache lines for 128 bytes as comprised if Enabled. The default settings are **Disabled** for the Intel 5100 Series Processors and **Enable** for the 5000 Series Processors.

**Hardware Prefetcher (Available when supported by the CPU.)**

Set to **Enabled** to activate the hardware components that are used in conjunction with software programs to prefetch data in order to shorten execution cycles and maximize data processing efficiency. The options are Disabled and **Enabled**.

**Intel <R> Virtualization Technology (Available when supported by the CPU.)**

Select Enabled to use the feature of Virtualization Technology to allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are Enabled and **Disabled**. (Note: If there is any change to this setting, you will need to power off and restart the system for the change to take effect.) Please refer to Intel's web site for detailed information.

**Intel EIST Support (Available when supported by the CPU.)**

Select Enabled to use the Enhanced Intel SpeedStep Technology and allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. The options are Enabled and **Disabled**. Please refer to Intel's web site for detailed information.

**►I/O Device Configuration**

Access the submenu to make changes to the following settings.

**KBC Clock Input**

This setting allows you to select clock frequency for KBC. The options are 6MHz, 8MHz, **12MHz**, and 16MHz.

**Serial Port A**

This setting allows you to assign control of serial port A. The options are **Enabled** (user defined), Disabled, and Auto (BIOS- or OS- controlled).

**Base I/O Address**

This setting allows you to select the base I/O address for serial port A. The options are **3F8**, 2F8, 3E8, and 2E8.



### **Interrupt**

This setting allows you to select the IRQ (interrupt request) for serial port A. The options are IRQ3 and **IRQ4**.

### **Serial Port B**

This setting allows you to assign control of serial port B. The options are **Enabled** (user defined), Disabled, Auto (BIOS controlled) and OS Controlled.

#### **Mode**

This setting allows you to set the type of device that will be connected to serial port B. The options are **Normal** and IR (for an infrared device).

#### **Base I/O Address**

This setting allows you to select the base I/O address for serial port B. The options are 3F8, **2F8**, 3E8 and 2E8.

### **Interrupt**

This setting allows you to select the IRQ (interrupt request) for serial port B. The options are **IRQ3** and IRQ4.

### **Floppy Disk Controller**

This setting allows you to assign control of the floppy disk controller. The options are **Enabled** (user defined), Disabled, and Auto (BIOS and OS controlled).

#### **Base I/O Address**

This setting allows you to select the base I/O address for the Floppy port. The options are **Primary** and Secondary.

## ► DMI Event Logging

Access the submenu to make changes to the following settings.

### **Event Log Validity**

This is a display to inform you of the event log validity. It is not a setting.

### **Event Log Capacity**

This is a display to inform you of the event log capacity. It is not a setting.

### **View DMI Event Log**

Highlight this item and press <Enter> to view the contents of the event log.

### **Event Logging**

This setting allows you to **Enable** or Disable event logging.

### **ECC Event Logging**

This setting allows you to **Enable** or Disable ECC event logging.

### **Mark DMI Events as Read**

Highlight this item and press <Enter> to mark the DMI events as read.

### **Clear All DMI Event Logs**

Select Yes and press <Enter> to clear all DMI event logs. The options are Yes and **No**.

## ► Console Redirection

Access the submenu to make changes to the following settings.

### COM Port Address

This item allows you to specify which COM port to direct the remote console to: Onboard COM A or Onboard COM B. This setting can also be **Disabled**.

### BAUD Rate

This item allows you to set the BAUD rate for console redirection. The options are 300, 1200, 2400, 9600, **19.2K**, 38.4K, 57.6K, and 115.2K.

### Console Type

This item allows you to set console redirection type. The options are VT100, VT100,8bit, PC-ANSI, 7bit, **PC ANSI**, VT100+, VT-UTF8 and ASCII.

### Flow Control

This item allows you to select the flow control option for console redirection. The options are: None, XON/XOFF, and **CTS/RTS**.

### Console Connection

This item allows you to decide how console redirection is to be connected: either **Direct** or Via Modem.

### Continue CR after POST

Choose whether to continue with console redirection after the POST routine. The options are On and **Off**.

## ► Hardware Monitor Logic

**Note:** The Phoenix BIOS will automatically detect the type of CPU(s) and hardware monitoring chip used on the motherboard and will display the Hardware Monitoring Screen accordingly. Your Hardware Monitoring Screen may look like the one shown on this page, or on p. 7-19, depending on the type of CPU(s) and HW Monitoring chip you are using.

### CPU Temperature Threshold

This option allows the user to set a CPU temperature threshold that will activate the alarm system when the CPU temperature reaches this pre-set temperature threshold. The options are 75°C, **80°C**, 85°C and 90°C.

Highlight this and hit <Enter> to see monitor data for the following items:

**CPU1 Temperature**

**CPU1 Second Core Temperature**

**CPU2 Temperature**

**CPU2 Second Core Temperature**

**System Temperature**

**Fan1-Fan8 Speeds:** If the feature of Auto Fan Control is enabled, the BIOS will automatically display the status of the fans indicated in this item.

### Fan Speed Control Modes

This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase, and vice versa. If the option is set to 3-pin fan, the fan speed is controlled by voltage. If the option is set to 4-pin, the fan speed will be controlled by Pulse Width Modulation (PWM). Select 3-pin if your chassis came with 3-pin fan headers. Select 4-pin if your chassis came with 4-pin fan headers. Select Workstation if your system is used as a Workstation. Select Server if your system is used as a Server. Select Disable to disable fan speed control and allow the onboard fans to constantly run at full speed (12V). The Options are: **1. Disable**, 2. 3-pin (Server), 3. 3-pin (Workstation), 4. 4-pin (Server) and 5. 4-pin (Workstation).

### Voltage Monitoring

The following items will be monitored and displayed:

Vcore A, Vcore B, -12V, P1V5, +3.3V, +12V, 5Vsb, 5VDD, P\_VTT, Vbat

► **Hardware Monitor Logic** (See note on page 7-18.)

**CPU Temperature Threshold**

This option allows the user to set a CPU temperature threshold that will activate the alarm system when the CPU temperature reaches this pre-set temperature threshold. The hardcode default setting is **75°C**.

**CPU1 Temperature/CPU1 Second Core**

**CPU2 Temperature/CPU2 Second Core**

**Temperature Monitoring (Available if supported by the CPU)**

Highlight this and hit <Enter> to see monitor data for the following PECI (Platform Environment Control Interface) items:

**PECI Agent 1 Temperature**

**PECI Agent 2 Temperature**

**PECI Agent 3 Temperature**

**PECI Agent 4 Temperature**

**System Temperature**

**Fan1-Fan5 Speeds:** If the feature of Auto Fan Control is enabled, the BIOS will automatically display the status of the fans indicated in this item.

**Fan Speed Control Modes**

This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase, and vice versa. If the option is set to 3-pin fan, the fan speed is controlled by voltage. If the option is set to 4-pin, the fan speed will be controlled by Pulse Width Modulation (PWM). Select 3-pin if your chassis came with 3-pin fan headers. Select 4-pin if your chassis came with 4-pin fan headers. Select Workstation if your system is used as a Workstation. Select Server if your system is used as a Server. Select Disable to disable fan speed control and allow the onboard fans to constantly run at full speed (12V). The Options are: **1. Disable**, 2. 3-pin (Server), 3. 3-pin (Workstation), 4. 4-pin (Server) and 5. 4-pin (Workstation).

**Voltage Monitoring**

The following items will be monitored and displayed:

Vcore A, Vcore B, -12V, P1V5, +3.3V, +12V, 5Vsb, 5VDD, P\_VTT, Vbat

► **IPMI** (Available only when an IPMI card is installed in the system.)

PhoenixBIOS Setup Utility		
Advanced		
IPMI		Item Specific Help
IPMI Specification Version	2.0	Enable/Disable IPMI event logging. Disabling will still log events received via the system interface.
Firmware Version	2.1	
System Event Logging	[Enabled]	
Clear System Event Log	[Disabled]	
Existing Event Log number	282	
Event Log Control		
SYS Firmware Progress	[Disabled]	
BIOS POST Errors	[Enabled]	
BIOS POST Watchdog	[Disabled]	
OS boot Watchdog	[Disabled]	
Timer for loading OS (min)	[ 10]	
Time out action	[No Action]	

**IPMI Specification Version:** This item displays the current IPMI Version.

**Firmware Version:** This item displays the current Firmware Version.

### System Event Logging

Select Enabled to enable IPMI Event Logging. When this function is set to Disabled, the system will continue to log events received via system interface. The options are **Enabled** and Disabled.

### Clear System Event Logging

Enabling this function to force the BIOS to clear the system event logs during the next cold boot. The options are Enabled and **Disabled**.

### Existing Event Log Number

This item displays the number of the existing event log.

### Event Log Control

#### System Firmware Progress

Enabling this function to log POST progress. The options are Enabled and **Disabled**.

#### BIOS POST Errors

Enabling this function to log POST errors. The options are Enabled and **Disabled**.

### BIOS POST Watch Dog

Set to Enabled to enable POST Watch Dog. The options are Enabled and **Disabled**.

## OS Boot Watch Dog

Set to Enabled to enable OS Boot Watch Dog. The options are Enabled and Disabled.

## Timer for Loading OS (Minutes)

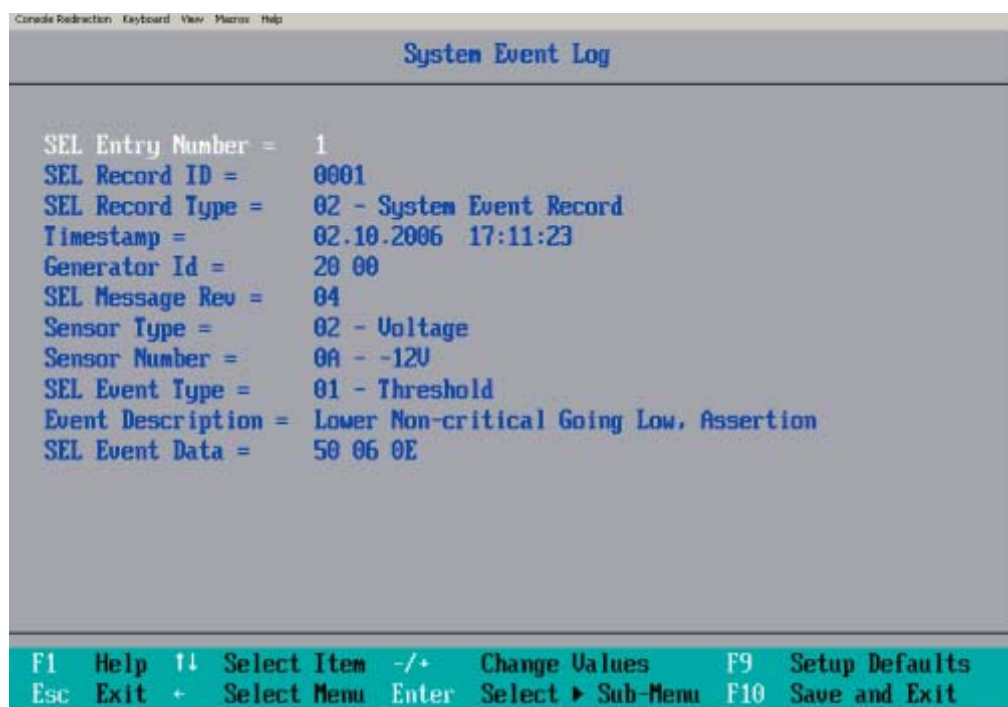
This feature allows the user to set the time value (in minutes) for the previous item: OS Boot Watch Dog by keying-in a desired number in the blank. The default setting is **10 (minutes.)** (Please ignore this option when OS Boot Watch Dog is set to Disabled.)

## Time Out Option

This feature allows the user to determine what action to take in an event of a system boot failure. The options are **No Action**, Reset, Power Off and Power Cycles.

## ► System Event Log/System Event Log (List Mode)

These options display the System Event (SEL) Log and System Event (SEL) Log in List Mode. Items include: SEL (System Event Log) Entry Number, SEL Record ID, SEL Record Type, Time Stamp, Generator ID, SEL Message Revision, Sensor Type, Sensor Number, SEL Event Type, Event Description, and SEL Event Data.



► **Realtime Sensor Data**

This feature display information from motherboard sensors, such as temperatures, fan speeds and voltages of various components.

Console Redirection Keyboard View Macros Help

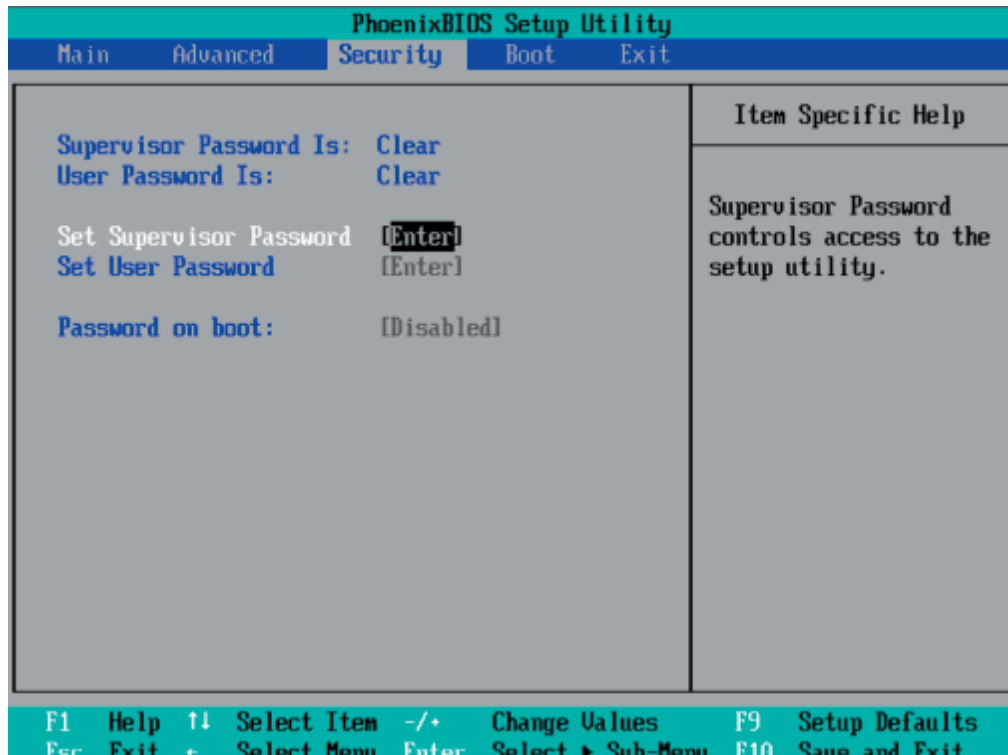
Realtime Sensor Data					
Sensor Type	Sensor Name	Sensor Data	Sensor Units	Lower Limit	Upper Limit
Temp	CPU1 CoreA	48.00	degrees C	0.00	75.00
	CPU1 CoreB	54.00	degrees C	0.00	75.00
	CPU2 CoreA	47.00	degrees C	0.00	75.00
	CPU2 CoreB	46.00	degrees C	0.00	75.00
	System	44.00	degrees C	0.00	75.00
Voltage	CPU1 Core	1.13	Volts	0.97	1.47
	CPU2 Core	1.16	Volts	0.97	1.47
	3.3V	3.30	Volts	2.95	3.62

F1 Help F1 Select Item +/- Change Values F9 Setup Defaults  
Esc Exit + Select Menu Enter Select ► Sub-Menu F10 Save and Exit



## 7-5 Security

Choose Security from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. Security setting options are displayed by highlighting the setting using the arrow keys and pressing <Enter>. All Security BIOS settings are described in this section.



### Supervisor Password Is:

This feature indicates if a supervisor password has been entered to the system. Clear means such a password has not been used, and Set means a supervisor password has been entered.

### User Password Is:

This feature indicates if a user password has been entered to the system. Clear means such a password has not been used, and Set means a user password has been entered.

### Set Supervisor Password

When the item Set "Supervisor Password" is highlighted, hit the <Enter> key. When prompted, type the Supervisor's password in the dialogue box to set or to change supervisor's password, which allows access to the BIOS.

### Set User Password

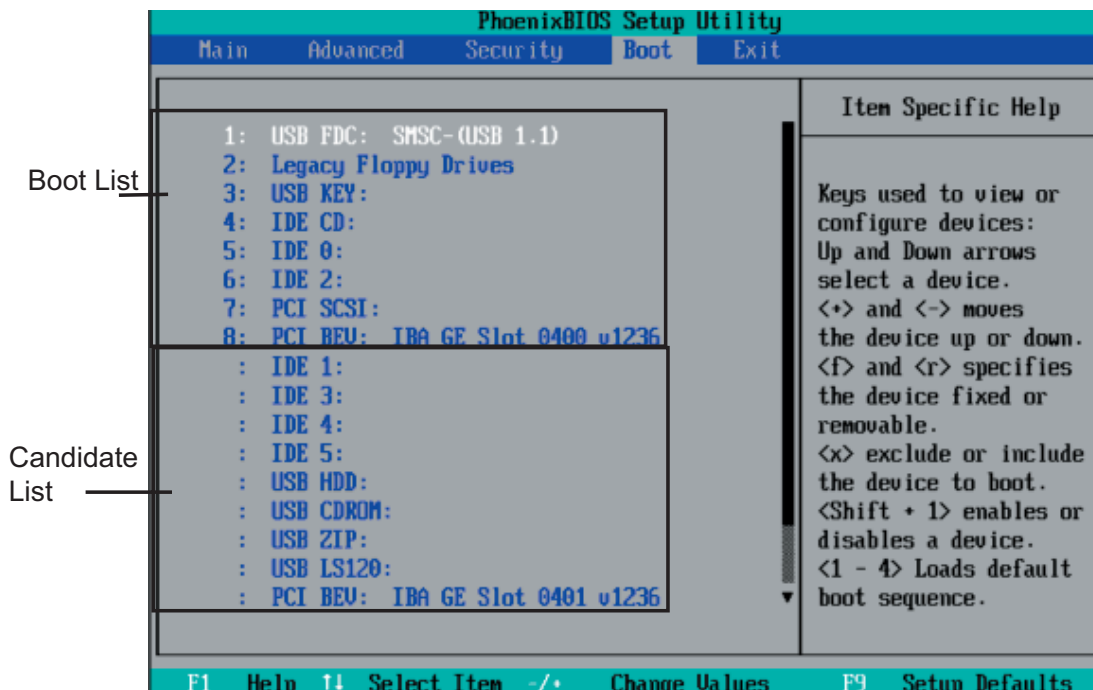
When the item "Set User Password" is highlighted, hit the <Enter> key. When prompted, type the user's password in the dialogue box to set or to change the user's password, which allows access to the system at boot-up.

## Password on Boot

This setting allows you to determine if a password is required for a user to enter the system at system boot. The options are **Enabled** (password required) and **Disabled** (password not required).

## 7-6 Boot

Choose Boot from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. See details on how to change the order and specs of boot devices in the Item Specific Help window. All Boot BIOS settings are described in this section.

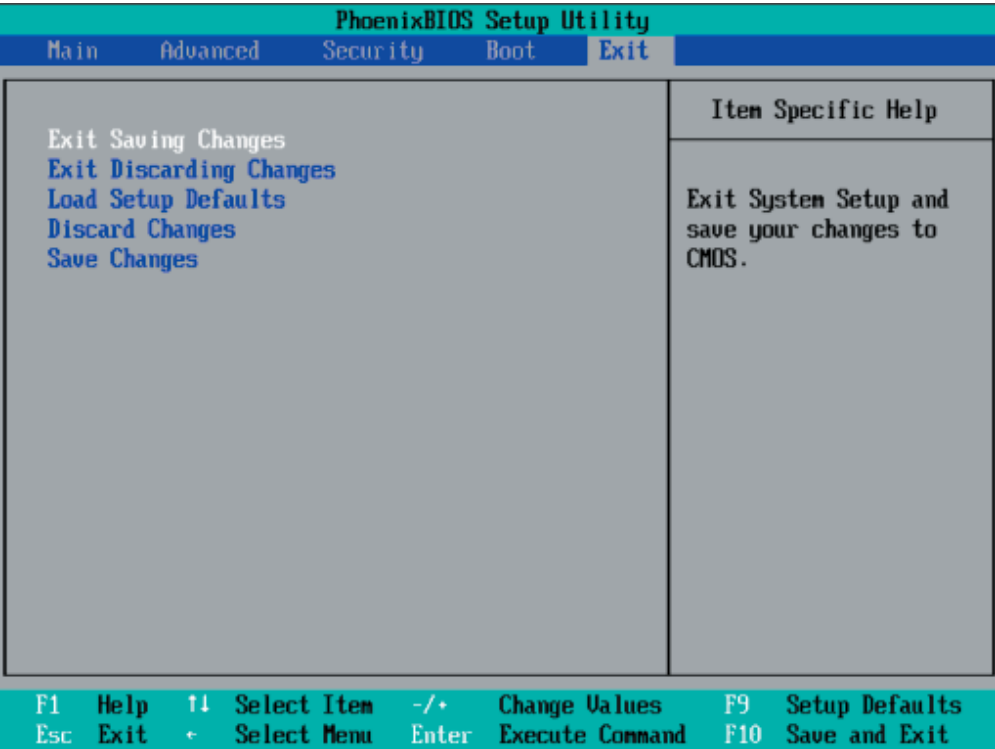


### Boot Priority Order/Excluded from Boot Orders

The devices included in the boot list section (above) are bootable devices listed in the sequence of boot order as specified. The boot functions for the devices included in the candidate list (above) are currently disabled. Use a <+> key or a <-> key to move the device up or down. Use the <f> key or the <r> key to specify the type of an USB device, either fixed or removable. You can select one item from the boot list and hit the <x> key to remove it from the list of bootable devices (to make its resource available for other bootable devices). Subsequently, you can select an item from the candidate list and hit the <x> key to remove it from the candidate list and put it in the boot list. This item will then become a bootable device. See details on changing the boot priority order of a device in the "Item Specific Help" window.

## 7-7 Exit

Choose Exit from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. All Exit BIOS settings are described in this section.



### Exit Saving Changes

Highlight this item and hit <Enter> to save any changes you've made and to exit the BIOS Setup utility.

### Exit Discarding Changes

Highlight this item and hit <Enter> to exit the BIOS Setup utility without saving any changes you may have made.

### Load Setup Defaults

Highlight this item and hit <Enter> to load the default settings for all items in the BIOS Setup. These are the safest settings to use.

### Discard Changes

Highlight this item and hit <Enter> to discard (cancel) any changes you've made. You will remain in the Setup utility.

### Save Changes

Highlight this item and hit <Enter> to save any changes you've made. You will remain in the Setup utility.

**Notes**

## Appendix A

### BIOS POST Messages

During the Power-On Self-Test (POST), the BIOS will check for problems. If a problem is found, the BIOS will activate an alarm or display a message. The following is a list of such BIOS messages.

**Failure Fixed Disk**

Fixed disk is not working or not configured properly. Check to see if fixed disk is attached properly. Run Setup. Find out if the fixed-disk type is correctly identified.

**Stuck key**

Stuck key on keyboard.

**Keyboard error**

Keyboard not working.

**Keyboard Controller Failed**

Keyboard controller failed test. May require replacing keyboard controller.

**Keyboard locked - Unlock key switch**

Unlock the system to proceed.

**Monitor type does not match CMOS - Run SETUP**

Monitor type not correctly identified in Setup

**Shadow Ram Failed at offset: nnnn**

Shadow RAM failed at offset **nnnn** of the 64k block at which the error was detected.

**System RAM Failed at offset: nnnn**

System RAM failed at offset **nnnn** of in the 64k block at which the error was detected.

**Extended RAM Failed at offset: nnnn** Extended memory not working or not configured properly at offset **nnnn**.

**System battery is dead - Replace and run SETUP**

The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.

**System CMOS checksum bad - Default configuration used**

System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter Setup and enter your own values. If the error persists, check the system battery or contact your dealer.

**System timer error**

The timer test failed. Requires repair of system board.

**Real time clock error**

Real-Time Clock fails BIOS hardware test. May require board repair.

**Check date and time settings**

BIOS found date or time out of range and reset the Real-Time Clock. May require setting legal date (1991-2099).

**Previous boot incomplete - Default configuration used**

Previous POST did not complete successfully. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On systems with control of **wait states**, improper Setup settings can also terminate POST and cause this error on the next boot. Run Setup and verify that the waitstate configuration is correct. This error is cleared the next time the system is booted.

**Memory Size found by POST differed from CMOS**

Memory size found by POST differed from CMOS.

**Diskette drive A error**

**Diskette drive B error**

Drive A: or B: is present but fails the BIOS POST diskette tests. Check to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is attached correctly.

**Incorrect Drive A type - run SETUP**

Type of floppy drive A: not correctly identified in Setup.

**Incorrect Drive B type - run SETUP**

Type of floppy drive B: not correctly identified in Setup.

**System cache error - Cache disabled**

RAM cache failed and BIOS disabled the cache. On older boards, check the cache jumpers. You may have to replace the cache. See your dealer. A disabled cache slows system performance considerably.

**CPU ID:**

CPU socket number for Multi-Processor error.

**EISA CMOS not writeable**

ServerBIOS2 test error: Cannot write to EISA CMOS.

**DMA Test Failed**

ServerBIOS2 test error: Cannot write to extended **DMA** (Direct Memory Access) registers.

**Software NMI Failed**

ServerBIOS2 test error: Cannot generate software NMI (Non-Maskable Interrupt).

**Fail-Safe Timer NMI Failed**

ServerBIOS2 test error: Fail-Safe Timer takes too long.

**device Address Conflict**

Address conflict for specified **device**.

**Allocation Error for: device**

Run ISA or EISA Configuration Utility to resolve resource conflict for the specified **device**.

**CD ROM Drive**

CD ROM Drive identified.

**Entering SETUP ...**

Starting Setup program

**Failing Bits: nnnn**

The hex number **nnnn** is a map of the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. See errors 230, 231, or 232 above for offset address of the failure in System, Extended, or Shadow memory.

**Fixed Disk n**

Fixed disk **n** (0-3) identified.

**Invalid System Configuration Data**

Problem with NVRAM (CMOS) data.

**I/O device IRQ conflict**

I/O device IRQ conflict error.

**PS/2 Mouse Boot Summary Screen:**

PS/2 Mouse installed.

**nnnn kB Extended RAM Passed**

Where **nnnn** is the amount of RAM in kilobytes successfully tested.

**nnnn Cache SRAM Passed**

Where **nnnn** is the amount of system cache in kilobytes successfully tested.

**nnnn kB Shadow RAM Passed**

Where **nnnn** is the amount of shadow RAM in kilobytes successfully tested.

**nnnn kB System RAM Passed**

Where **nnnn** is the amount of system RAM in kilobytes successfully tested.

**One or more I2O Block Storage Devices were excluded from the Setup Boot Menu**

There was not enough room in the IPL table to display all installed I2O block-storage devices.

**Operating system not found**

Operating system cannot be located on either drive A: or drive C:. Enter Setup and see if fixed disk and drive A: are properly identified.

**Parity Check 1 nnnn**

Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????**. Parity is a method for checking errors in binary data. A parity error indicates that some data has been corrupted.

**Parity Check 2 nnnn**

Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????**.



**Press <F1> to resume, <F2> to Setup, <F3> for previous**

Displayed after any recoverable error message. Press <F1> to start the boot process or <F2> to enter Setup and change the settings. Press <F3> to display the previous screen (usually an initialization error of an **Option ROM**, i.e., an add-on card). Write down and follow the information shown on the screen.

**Press <F2> to enter Setup**

Optional message displayed during POST. Can be turned off in Setup.

**PS/2 Mouse:**

PS/2 mouse identified.

**Run the I2O Configuration Utility**

One or more unclaimed block storage devices have the Configuration Request bit set in the LCT. Run an I2O Configuration Utility (e.g. the SAC utility).

**System BIOS shadowed**

System BIOS copied to shadow RAM.

**UMB upper limit segment address: *nnnn***

Displays the address *nnnn* of the upper limit of **Upper Memory Blocks**, indicating released segments of the BIOS which can be reclaimed by a virtual memory manager.

**Video BIOS shadowed**

Video BIOS successfully copied to shadow RAM.

**Notes**

## Appendix B

### BIOS POST Codes

This section lists the POST (Power On Self Test) codes for the PhoenixBIOS. POST codes are divided into two categories: recoverable and terminal.

#### Recoverable POST Errors

When a recoverable type of error occurs during POST, the BIOS will display an POST code that describes the problem. BIOS may also issue one of the following beep codes:

- 1 long and two short beeps - video configuration error
- 1 repetitive long beep - no memory detected

#### Terminal POST Errors

If a terminal type of error occurs, BIOS will shut down the system. Before doing so, BIOS will write the error to port 80h, attempt to initialize video and write the error in the top left corner of the screen. The following is a list of codes that may be written to port 80h.

POST Code	Description
-----------	-------------

01h	IPMI Initialization
02h	Verify Real Mode
03h	Disable Non-Maskable Interrupt (NMI)
04h	Get CPU type
06h	Initialize system hardware
07h	Disable shadow and execute code from the ROM.
08h	Initialize chipset with initial POST values
09h	Set IN POST flag
0Ah	Initialize CPU registers
0Bh	Enable CPU cache
0Ch	Initialize caches to initial POST values
0Eh	Initialize I/O component
0Fh	Initialize the local bus IDE
10h	Initialize Power Management
11h	Load alternate registers with initial POST values
12h	Restore CPU control word during warm boot
13h	Reset PCI Bus Mastering devices
14h	Initialize keyboard controller
16h	1-2-2-3 BIOS ROM checksum
17h	Initialize cache before memory Auto size

<b>POST Code</b>	<b>Description</b>
18h	8254 timer initialization
1Ah	8237 DMA controller initialization
1Ch	Reset Programmable Interrupt Controller
20h	1-3-1-1 Test DRAM refresh
22h	1-3-1-3 Test 8742 Keyboard Controller
24h	Set ES segment register to 4 GB
28h	Auto size DRAM
29h	Initialize POST Memory Manager
2Ah	Clear 512 kB base RAM
2Ch	1-3-4-1 RAM failure on address line <b>xxxx</b> *
2Eh	1-3-4-3 RAM failure on data bits <b>xxxx</b> * of low byte of memory bus
2Fh	Enable cache before system BIOS shadow
32h	Test CPU bus-clock frequency
33h	Initialize Phoenix Dispatch Manager
36h	Warm start shut down
38h	Shadow system BIOS ROM
3Ah	Auto size cache
3Ch	Advanced configuration of chipset registers
3Dh	Load alternate registers with CMOS values
41h	Initialize extended memory for RomPilot (optional)
42h	Initialize interrupt vectors
45h	POST device initialization
46h	2-1-2-3 Check ROM copyright notice
48h	Check video configuration against CMOS
49h	Initialize PCI bus and devices
4Ah	Initialize all video adapters in system
4Bh	QuietBoot start (optional)
4Ch	Shadow video BIOS ROM
4Eh	Display BIOS copyright notice
4Fh	Initialize MultiBoot
50h	Display CPU type and speed
51h	Initialize EISA board (optional)
52h	Test keyboard
54h	Set key click if enabled
55h	Enable USB devices
58h	2-2-3-1 Test for unexpected interrupts
59h	Initialize POST display service
5Ah	Display prompt "Press <ESC> to enter SETUP"
5Bh	Disable CPU cache

---

POST Code	Description
5Ch	Test RAM between 512 and 640 kB
60h	Test extended memory
62h	Test extended memory address lines
64h	Jump to UserPatch1
66h	Configure advanced cache registers
67h	Initialize Multi Processor APIC
68h	Enable external and CPU caches
69h	Setup System Management Mode (SMM) area
6Ah	Display external L2 cache size
6Bh	Load custom defaults (optional)
6Ch	Display shadow-area message
70h	Display error messages
72h	Check for configuration errors
76h	Check for keyboard errors
7Ch	Set up hardware interrupt vectors
7Dh	Initialize Intelligent System Monitoring (optional)
7Eh	Initialize coprocessor if present
80h	Disable onboard Super I/O ports and IRQs (optional)
81h	Late POST device initialization
82h	Detect and install external RS232 ports
83h	Configure non-MCD IDE controllers
84h	Detect and install external parallel ports
85h	Initialize PC-compatible PnP ISA devices
86h	Re-initialize onboard I/O ports.
87h	Configure Motherboard Configurable Devices (optional)
88h	Initialize BIOS Data Area
89h	Enable Non-Maskable Interrupts (NMIs)
8Ah	Initialize Extended BIOS Data Area
8Bh	Test and initialize PS/2 mouse
8Ch	Initialize floppy controller
8Fh	Determine number of ATA drives (optional)
90h	Initialize hard-disk controllers
91h	Initialize local-bus hard-disk controllers
92h	Jump to UserPatch2
93h	Build MPTABLE for multi-processor boards
95h	Install CD ROM for boot
96h	Clear huge ES segment register
97h	Fix up Multi Processor table
98h	1-2 Search for option ROMs and shadow if successful. One long, two short beeps on checksum failure

---

<b>POST Code</b>	<b>Description</b>
99h	Check for SMART Drive (optional)
9Ch	Set up Power Management
9Dh	Initialize security engine (optional)
9Eh	Enable hardware interrupts
9Fh	Determine number of ATA and SCSI drives
A0h	Set time of day
A2h	Check key lock
A4h	Initialize typematic rate
A8h	Erase <ESC> prompt
AAh	Scan for <ESC> key stroke
ACh	Enter SETUP
AEh	Clear Boot flag
B0h	Check for errors
B1h	Inform RomPilot about the end of POST (optional)
B2h	POST done - prepare to boot operating system
B4h	1 One short beep before boot
B5h	Terminate QuietBoot (optional)
B6h	Check password (optional)
B7h	Initialize ACPI BIOS and PPM Structures
B9h	Prepare Boot
BAh	Initialize SMBIOS
BCh	Clear parity checkers
BDh	Display MultiBoot menu
BEh	Clear screen (optional)
BFh	Check virus and backup reminders
C0h	Try to boot with INT 19
C1h	Initialize POST Error Manager (PEM)
C2h	Initialize error logging
C3h	Initialize error display function
C4h	Initialize system error flags
C6h	Console redirection init.
C7h	Unhook INT 10h if console redirection enabled
C8h	Force check (optional)
C9h	Extended ROM checksum (optional)
CDh	Reclaim console redirection vector

**POST Code    Description**

D2h	Unknown interrupt
D4h	Check Intel Branding string
D8h	Alert Standard Format initialization
D9h	Late init for IPMI
DEh	Log error if micro-code not updated properly

**The following are for boot block in Flash ROM****POST Code    Description**

E0h	Initialize the chipset
E1h	Initialize the bridge
E2h	Initialize the CPU
E3h	Initialize system timer
E4h	Initialize system I/O
E5h	Check force recovery boot
E6h	Checksum BIOS ROM
E7h	Go to BIOS
E8h	Set Huge Segment
E9h	Initialize Multi Processor
EAh	Initialize OEM special code
EBh	Initialize PIC and DMA
ECh	Initialize Memory type
EDh	Initialize Memory size
EEh	Shadow Boot Block
EFh	System memory test
F0h	Initialize interrupt vectors
F1h	Initialize Run Time Clock
F2h	Initialize video
F3h	Initialize System Management Manager
F4h	Output one beep
F5h	Clear Huge Segment
F6h	Boot to Mini DOS
F7h	Boot to Full DOS

If the BIOS detects error 2C, 2E, or 30 (base 512K RAM error), it displays an additional word-bitmap (**xxxx**) indicating the address line or bits that failed. For example, "2C 0002" means address line 1 (bit one set) has failed. "2E 1020" means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits. The BIOS also sends the bitmap to the port-80 LED display. It first displays the checkpoint code, followed by a delay, the high-order byte, another delay, and then the loworder byte of the error. It repeats this sequence continuously.

**Notes**



## Appendix C

# Software Installation

After all the hardware has been installed, you must first configure Intel's ESB2 SATA RAID before you install the Windows Operating System and other software drivers.

### Important Notes:

If you do not wish to configure onboard SATA RAID functions, please go directly to Section C-3.

This chapter describes RAID Configuration Instructions for the Intel ESB2 RAID Controller designed for Windows OS.

## C-1 Introduction

To configure the SATA RAID functions, you must first use the Intel ESB2 SATA RAID Utility program to configure the RAID Level that you desire before installing the Windows XP/2000/2003 operating system and other software drivers. (The necessary drivers are all included on the Supermicro CD that came packaged with your serverboard.) Note that the current version of the ESB2 SATA RAID Utility can only support Windows XP/2000/2003 Operating Systems.

### Serial ATA (SATA)

Serial ATA (SATA) is a physical storage interface that uses a single cable with a minimum of four wires to create a point-to-point connection between devices. It is a serial link, which supports transfer rates up to 3Gbps. Because the serial cables used in SATA are thinner than the traditional cables used in Parallel ATA (PATA), SATA systems have better airflow and can be installed in smaller chassis than Parallel ATA. In addition, the cables used in PATA are limited to a length of 40cm, while Serial ATA cables can be up to one meter in length. Overall, SATA provides better functionality than PATA.

### Introduction to Intel ESB2 Serial RAID

Located in the South Bridge of the Blackford Mukilteo chipset, the I/O Controller Hub (ESB2) provides the I/O subsystem with access to the rest of the system. It supports a single-channel UltraATA/100 Bus Master IDE controller (PATA) and six Serial ATA (SATA) ports. The ESB2 supports the following PATA and SATA device configurations: Legacy mode and Native mode.

## RAID Configurations

The following types of RAID configurations are supported:

RAID 0 (Data Striping): this writes data in parallel, interleaved ("striped") sections of two hard drives. Data transfer rate is doubled over using a single disk.

RAID1 (Data Mirroring): an identical data image from one drive is copied to another drive. The second drive must be the same size or larger than the first drive.

RAID 10 (Striping & Mirroring): RAID 0 and 1 schemes are combined (without parity information) to get the benefits of both.

RAID 5: both data and parity information are striped and mirrored across three or more hard drives.

## Intel Matrix Storage

The Intel Matrix Storage, supported by the ESB2, allows the user to create RAID 0, RAID 1, RAID 10 and RAID 5 sets by using only six identical hard disk drives. The Intel Matrix Storage Technology creates two partitions on each hard disk drive and generate a virtual RAID 0, RAID 1, RAID 10 and RAID 5 sets. It also allows you the change the HDD partition size without any data.

## Configuring BIOS for SATA RAID Functions (Native Mode)

1. Press the <Del> key during system bootup to enter the BIOS Setup Utility.

**Note:** If it is the first time powering on the system, we recommend you load the Optimized Default Settings. If you have already done so, please skip to Step 3.

2. Use the arrow keys to select the "Exit" Settings. Once in the "Exit" settings, Scroll down to select "Load Optimized Default Settings" and press the <Enter> key. Select "OK" to confirm the selection. Press the <Enter> key to load the default settings for the BIOS.

3. Use the arrow keys to select the "Main" section in BIOS.

4. Scroll down to "SATA Control Mode" and press the <Enter> key to select "Enhanced"

5. Scroll down to "SATA RAID Enabled" and press <Enter>. Then, select "Enabled."

6. Scroll down to "Exit". Select "Save and Exit" from the "Exit" menu. Press the <Enter> key to save the changes and exit the BIOS.

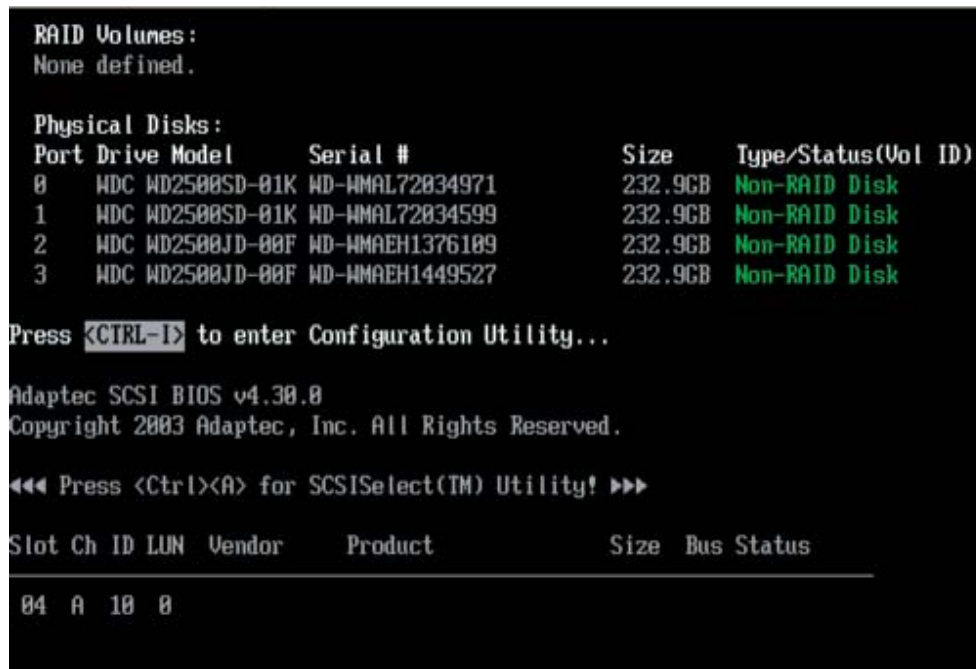
7. Once you've exited the BIOS Utility, the system will re-boot.

8. During the system boot-up, press the <Ctrl> and <I> keys simultaneously to run the Intel RAID Configuration Utility when prompted by the following message: *Press <Ctrl> <I> for Intel RAID Configuration Utility.*

## Using the Intel ESB2 SATA RAID Utility Program

### 1. Creating, Deleting and Resetting RAID Volumes

- a. After the system exits from the BIOS Setup Utility, it will automatically reboot. The following screen appears after the Power-On Self Test.



```

RAID Volumes:
None defined.

Physical Disks:
Port Drive Model      Serial #              Size   Type/Status(Vol ID)
0    WDC WD2500SD-01K  WD-WMAL72034971      232.9GB Non-RAID Disk
1    WDC WD2500SD-01K  WD-WMAL72034599      232.9GB Non-RAID Disk
2    WDC WD2500JD-00F  WD-WMAEH1376109      232.9GB Non-RAID Disk
3    WDC WD2500JD-00F  WD-WMAEH1449527      232.9GB Non-RAID Disk

Press <CTRL-I> to enter Configuration Utility...

Adaptec SCSI BIOS v4.30.0
Copyright 2003 Adaptec, Inc. All Rights Reserved.

<<< Press <Ctrl><A> for SCSISelect(TM) Utility! >>>

Slot Ch ID LUN  Vendor      Product              Size  Bus Status
-----
04  A  10  0

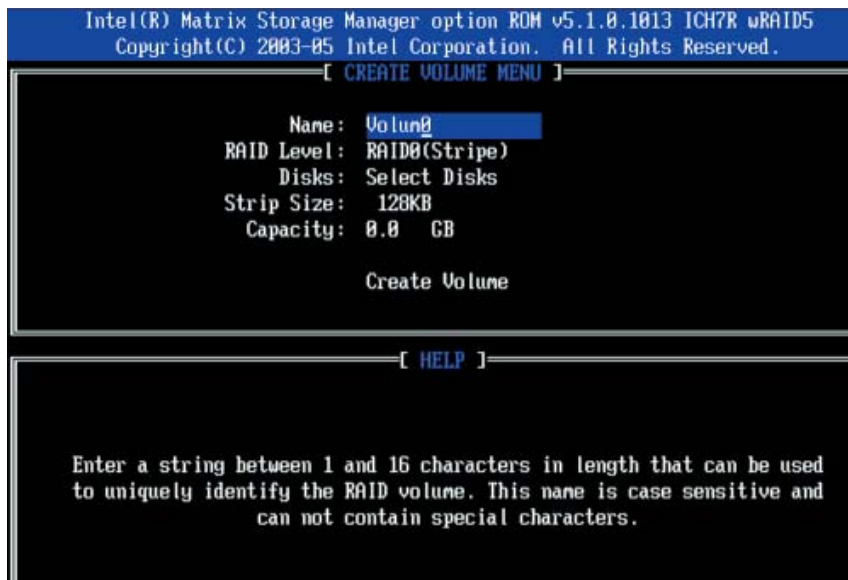
```

- b. When you see the above screen, press the <Ctrl> and the <I> keys simultaneously to have the main menu of the SATA RAID Utility appear:

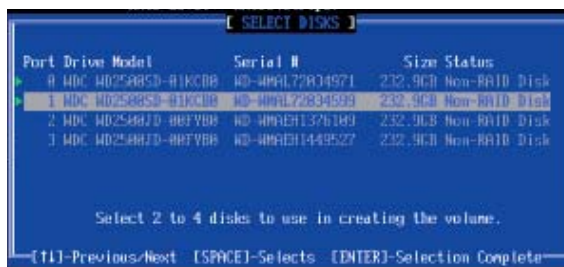
**Note:** All graphics and screen shots shown in this manual are for reference only. The screen shots shown in the manual do not imply Supernicro's endorsement or non-endorsement of any 3rd party's product. Your screens may or many not look exactly the same as the graphics shown in this manual.

## Creating a RAID 0 Volume

- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



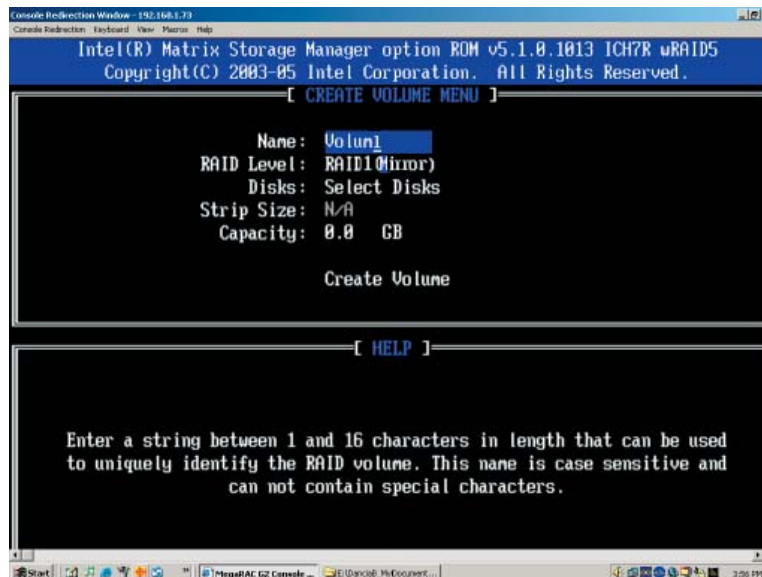
- b. Specify a name for the **RAID 0** set and press the <Tab> key or the <Enter> key to go to the next field. (You can use the <Esc> key to select the previous menu.)
- c. When RAID Level item is highlighted, press the <Up Arrow>, <Down Arrow> keys to select **RAID 0 (Stripe)** and hit <Enter>.
- d. When the Disks item is highlighted, press <Enter> to select the HDD to configure as RAID. The following pop-up screen displays:



- e. Use the <Up Arrow> and <Down Arrow> keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the selection of the drive.
- f. Use the <Up Arrow>, <Down Arrow> keys to select the stripe size, ranged from 4 KB to 128 KB for the RAID 0 array, and hit <Enter>. (\*Note: For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.)
- g. Press <Enter> when the Create Volume item is highlighted. A warning message displays.
- h. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

## Creating a RAID 1 Volume

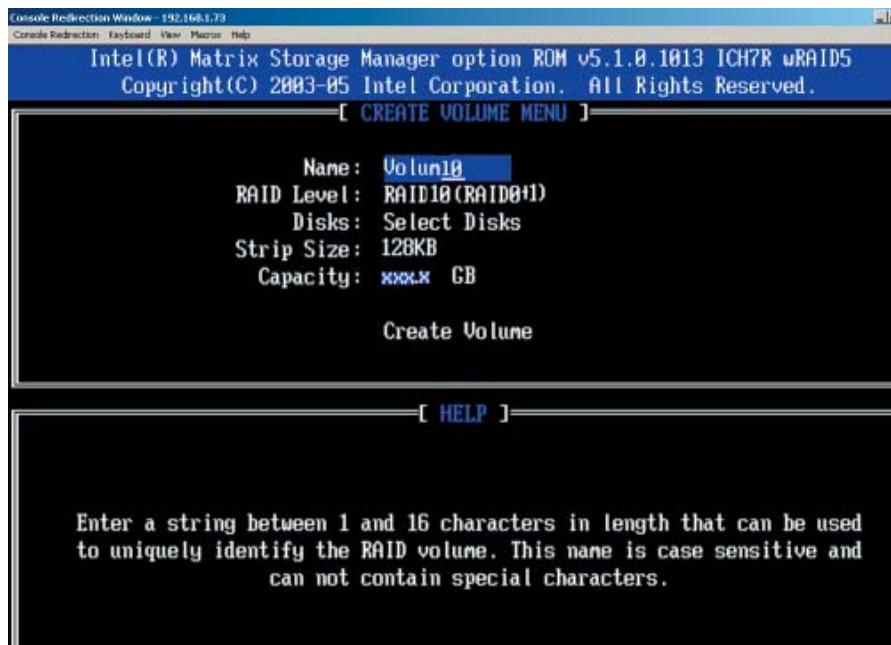
- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



- b. Specify a name for the **RAID 1** set and press the <Tab> key or the <Enter> key to go to the next field. (You can use the <Esc> key to select the previous menu.)
- c. When RAID Level item is highlighted, press the <Up Arrow>, <Down Arrow> keys to select **RAID 1 (Mirror)** and hit <Enter>.
- d. When the Capacity item is highlighted, enter your RAID volume capacity and hit <Enter>. The default setting is the maximum capacity allowed.
- e. Press <Enter> when the Create Volume item is highlighted. A warning message displays.
- f. When asked "Are you sure you want to create this volume (Y/N)", press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

## Creating a RAID 10 (RAID 1+ RAID 0)

- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



- b. Specify a name for the **RAID 10** set and press <Enter>.
- c. When RAID Level item is highlighted, use the <Up Arrow>, <Down Arrow> keys to select **RAID 10 (RAID1 + RAID0)** and hit <Enter>.
- d. When Stripe Size is highlighted, use the <Up Arrow>, <Down Arrow> keys to select the stripe size from 4 KB to 128 KB for your RAID 10 and hit <Enter>. The default setting is 6 4KB.
- Note:** For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size.
- e. When the RAID Volume Capacity item is highlighted, enter your RAID volume capacity and hit <Enter>. The default setting is the maximum capacity allowed.
- f. Press <Enter> when the Create Volume item is highlighted. A warning message displays.
- g. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

## Creating a RAID 5 Set (Parity)

- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



- b. Specify a name for the **RAID 5** set and press <Enter>.
- c. When the Raid Level is highlighted, use the <Up Arrow>, <Down Arrow> keys to select **RAID 5 (Parity)** and hit <Enter>.
- d. When the Disk item is highlighted, press <Enter> to select the HDD to configure as RAID.
- e. Use the <Up Arrow>, <Down Arrow> keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the selection of the drive.
- f. Use the <Up Arrow>, <Down Arrow> keys to select the stripe size, ranged from 4 KB to 128 KB for the RAID 5 array, and hit <Enter>. (For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.)
- g. Enter your desired RAID volume capacity and press <Enter> when the capacity item is highlighted. The default setting is the maximum capacity allowed.
- h. Press Enter when the Create Volume item is highlighted. A warning message displays.
- i. When asked "Are you sure you want to create this volume (Y/N)", press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

## Deleting a RAID Volume



**Warning!** Be sure to back up your data before deleting a RAID set. You will lose all data on the disk drives when deleting a RAID set.

- a. From the main menu, select item2-Delete RAID Volume, and press <Enter>.
- b. Use the <Up Arrow>, <Down Arrow> keys to select the RAID set you want to delete and press <Del>. A Warning message displays.
- c. When asked "Are you sure you want to delete this volume (Y/N)", press "Y" to delete the RAID volume, or type "N" to go back to the Delete Volume menu.



## Resetting to Non-RAID and Resetting a RAID HDD



**Warning!** Use cautious when resetting a RAID volume HDD to non-RAID or resetting a RAID HDD. Resetting a RAID volume HDD or resetting a RAID HDD will reformat the HDD and delete the internal RAID structure on the drive.

- a. From the main menu, select item 3-Reset Disks to Non- RAID, and press <Enter>. The following screen will appear:



- b. Use the <Up Arrow>, <Down Arrow> keys to highlight the RAID set drive to reset and press <Space> to select.
- c. Press <Enter> to reset the RAID set drive. A warning message displays.
- d. Press "Y" to reset the drive or type "N" to go back to the main menu.

### Exiting the Intel Matrix Storage Manager Utility:

- a. From the main menu, select "Exit" and press <Enter>. A warning message will appear.
- b. Press "Y" to reset the drive or type "N" to go back to the main menu.

## C-2 Installing Windows XP/2000/2003 for RAID Systems

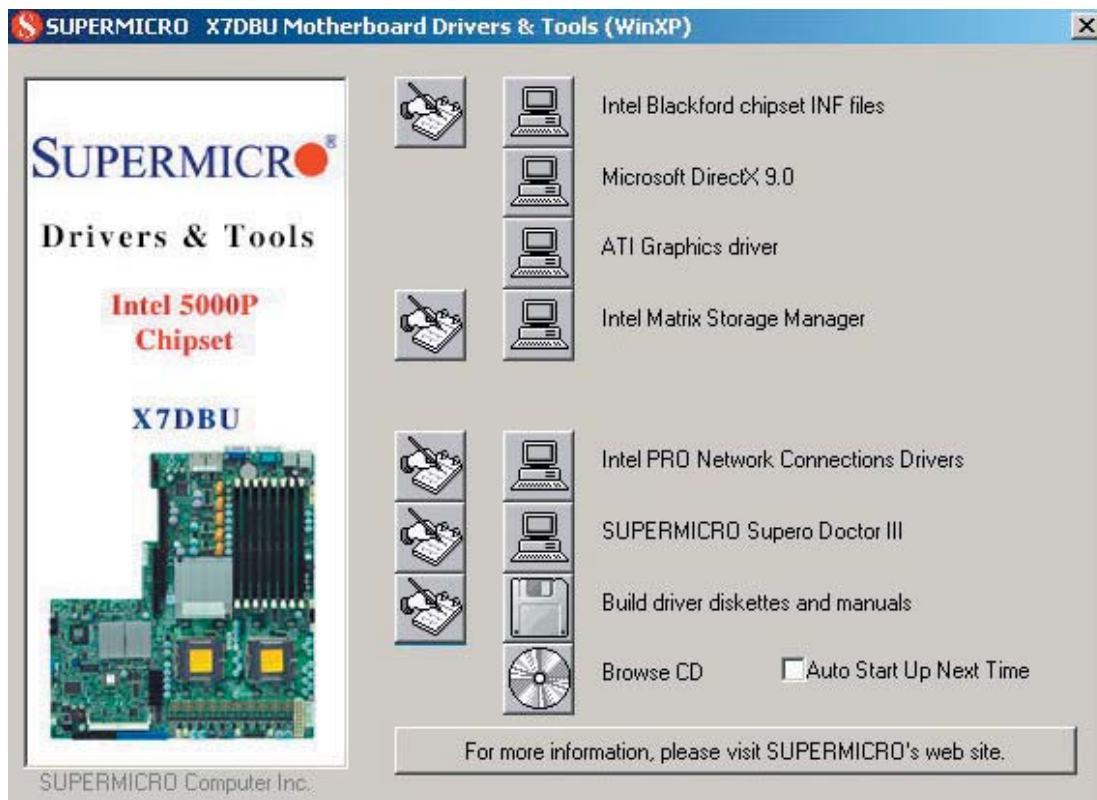
### New Operating System-Windows XP/2000/2003 Installation

- a. Insert the Microsoft Windows XP/2000/2003 Setup CD in the CD Drive and the system will start booting up from CD.
- b. Press the <F6> key when the message "Press F6 if you need to install a third party SCSI or RAID driver" displays.
- c. When the Windows XP/2000/2003 setup screen appears, press "S" to specify additional device(s).
- d. Insert the driver diskette-"Intel AA RAID XP/2000/2003 Driver for ESB2 into Drive A: and press the <Enter> key.
- e. Choose Intel(R) ESB2 *SATA RAID Controller* from the list indicated in the XP/2000/2003 setup screen and press the <Enter> key.
- f. Press the <Enter> key to continue the installation process. (If you need to specify any additional devices to be installed, do it at this time.) Once all devices are specified, press the <Enter> key to continue with the installation.
- g. From the Windows XP/2000/2003 setup screen, press the <Enter> key. The XP/2000/2003 setup will automatically load all device files and then continue with the Windows XP/2000/2003 installation.
- h. After the Windows XP/2000/2003 installation is completed, the system will automatically reboot.
- i. Insert the Supermicro CD that came with the package into the CD drive during system reboot - the screen on the following page will appear.

Note: the current version of the ESB2 SATA RAID Utility can only support Windows XP/2000/2003 Operating System.

## C-3 Installing the Operating System and other Software Programs

After the hardware has been installed, you must first install the operating system, and then, other software drivers. The necessary drivers are all included on the Supermicro CDs that came packaged with your motherboard.



### Driver/Tool Installation Display Screen

**Note:** Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. **After installing each item, you must re-boot the system before moving on to the next item on the list.** The bottom icon with a CD on it allows you to view the entire contents of the CD.

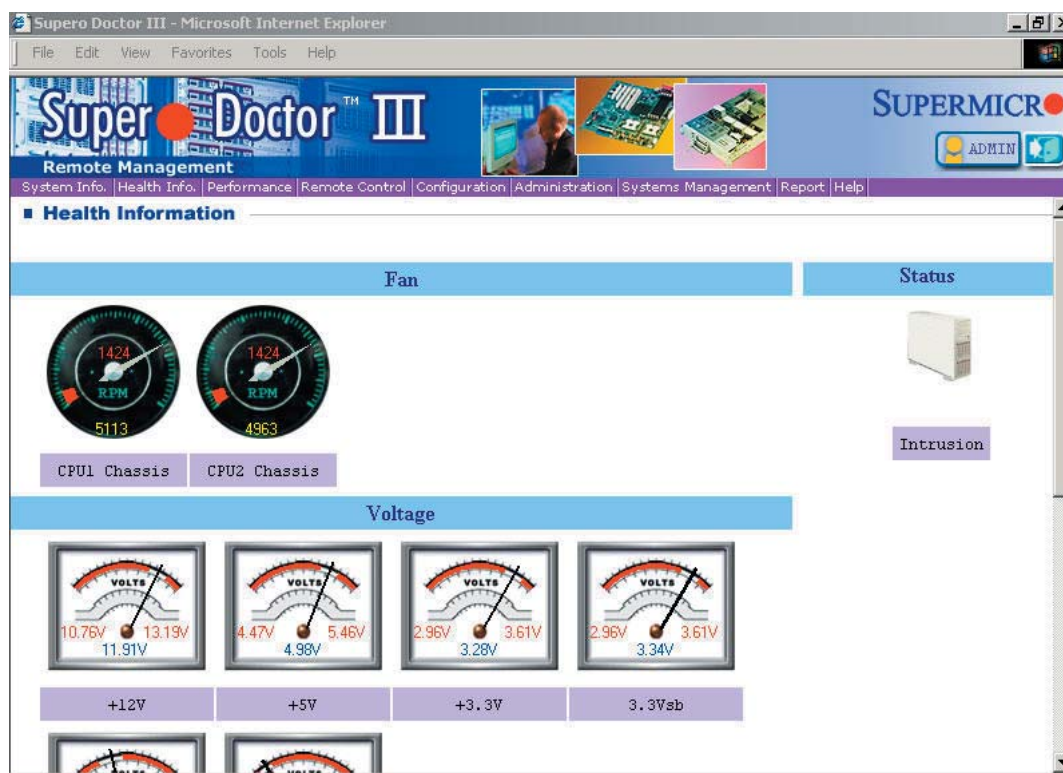
## Supero Doctor III

The Supero Doctor III program is a Web base management tool that supports remote management capability. It includes Remote and Local Management tools. The local management is called SD III Client. The Supero Doctor III program included on the CDROM that came with your motherboard allows you to monitor the environment and operations of your system. Supero Doctor III displays crucial system information such as CPU temperature, system voltages and fan status. See the Figure below for a display of the Supero Doctor III interface.

**Note:** The default User Name and Password for SuperDoctor III is ADMIN / ADMIN.

**Note:** When SuperDoctor III is first installed, it adopts the temperature threshold settings that have been set in BIOS. Any subsequent changes to these thresholds must be made within Super Doctor, as the Super Doctor settings override the BIOS settings. To set the BIOS temperature threshold settings again, you would first need to uninstall SuperDoctor III.

### Supero Doctor III Interface Display Screen-I (Health Information)



## Supero Doctor III Interface Display Screen-II (Remote Control)



Note: SD III Software Revision 1.0 can be downloaded from our Web Site at: [ftp://ftp.supermicro.com/utility/Supero\\_Doctor\\_III/](ftp://ftp.supermicro.com/utility/Supero_Doctor_III/). You can also download SDIII User's Guide at: <http://www.supermicro.com/PRODUCT/Manuals/SDIII/UserGuide.pdf>. For Linux, we will still recommend Supero Doctor II.

**Notes**

# Appendix D

## System Specifications

### Processors

Single or dual Intel® Xeon™ 5300/5100/5000 Sequence processors at a front side (system) bus speed of 1333/1066/667 MHz.

**Note:** Please refer to our web site for a complete listing of supported processors.

### Chipset

Intel 5000P/ESB2 chipset

### BIOS

8 Mb Phoenix® Flash ROM

### Memory Capacity

Eight 240-pin DIMM sockets supporting up to 32 GB of ECC FBD DDR2-667/533 SDRAM.

See the memory section in Chapter 5 for details.

### SATA Controller

Intel ESB2 on-chip controller for six-port Serial ATA (RAID 0, 1 5 and 10 supported)

### Peripheral Drive Bays

Three (3) 3.5 x 1" drive bays

### Expansion Slots (see page 5-9 for details)

Right side: one PCI-X 133 card or one PCI-E x8 card

Left side: two PCI-E x8 cards

### Serverboard

X7DBU (Extended ATX form factor)

Dimensions: 12 x 13.05 in (305 x 331 mm)

### Chassis

SC812L-520U Form Factor: 1U rackmount

Dimensions: (WxHxD) 16.8 x 1.7 x 25.6 in. (427 x 43 x 650 mm)

### **Weight**

Gross (Bare Bone): 33 lbs. (15 kg.)

### **System Cooling**

Two (2) 10-cm blower fans

### **System Input Requirements**

AC Input Voltage: 100-240 VAC

Rated Input Current: 7A (115V) to 3A (230V)

Rated Input Frequency: 50-60 Hz

### **Power Supply**

Rated Output Power: 520W (Model# PWS-521-1H20)

Rated Output Voltages: +5V (20A), +12V (39A), -12V (0.5A), +3.3V (16A), +5Vsb (3.0A)

### **BTU Rating**

3186 BTUs/hr (for rated output power of 560W)

### **Operating Environment**

Operating Temperature: 10° to 35° C (50° to 95° F)

Non-operating Temperature: -40° to 70° C (-40° to 158° F)

Operating Relative Humidity: 8% to 90% (non-condensing)

Non-operating Relative Humidity: 5 to 95% (non-condensing)

### **Regulatory Compliance**

Electromagnetic Emissions:

FCC Class B, EN 55022 Class B, EN 61000-3-2/-3-3, CISPR 22 Class B

Electromagnetic Immunity:

EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety:

EN 60950/IEC 60950-Compliant, UL Listed (USA), CUL Listed (Canada), TUV Certified (Germany), CE Marking (Europe)

California Best Management Practices Regulations for Perchlorate Materials:

This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. "Perchlorate Material-special handling may apply. See [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)"